



EU Twinning Project

IS12/ENP-APFI/08

Support to the Israeli Central Bureau of Statistics in the development of National Accounts, Education Statistics, Survey Methodology, ICBS Website and Coordination of Israel National Statistical System

Annex MR1-25: Documentation on Mandatory Results

(supplement to Final Report, March 2015)

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MR1 and MR2 - Twinning activities A1, A2, A.3

Component: National Accounts
Sub-component: Government Accounts

MR1: Definition of the structure of improved government finance accounts crossclassified by subsectors and COFOG functions

MR2: Presentation of EU experience on inter-institutional arrangements between National Statistics Offices and Ministries of Finance with regard to cooperation and data exchange

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List of Abbreviations

BC	Beneficiary Country (Israel)
BoI	Bank of Israel
ICBS	Central Bureau of Statistics (Israel)
COFOG	Classification of the Functions of Government
DST	Statistics Denmark
GFS	Government Finance Statistics
MoF	Ministry of Finance
MoI	Ministry of Interior
MoU	Memorandum of Understanding
MS	Member State

1 Summary description of the Twinning activities

The project included one study visit and two MS Expert missions to ICBS.

The study visit to Denmark (A2 activity) aimed to share the experience of Statistics Denmark in compilation of General Government accounts and financial accounts with the emphasis on issues such as organization of work, data collection, data processing, cooperation with government ministries and the Central bank.

Statistics Denmark presented the Danish compilation system for annual and quarterly GFS accounts with detailed explanations on financial and non-financial accounts. Also the central government accounts were presented separately.

Detailed explanations regarding consolidation issues were provided as well as the possible solutions for the existing statistical discrepancies in GFS accounts.

The purpose of the A.1 mission was to assess the current situation, to identify problems and indicate possible solutions to solve them. During the A1 mission the overview of municipality and state accounts were presented with emphasis on structure of municipalities, data collection, data processing and accounting systems. Detailed financial accounts were presented. The consolidation issues and statistical discrepancies issues were discussed. Representatives from the Ministry of Interior participated in the discussion about possible ways of data supply.

The purpose of the A.3 mission was to share the experience on the cooperation with the Ministry of Finance and to discuss sources and methods to improve data received from the compiled data. During the visit of the MS experts different topics related to government finance were presented by both ICBS and the MS experts:

1. The general classification and data source used in the compilation of government finance
2. Cooperation with the Ministry of Finance (MoF)
3. COFOG classification methods and borderline cases
4. Business register and sector classification
5. Public private partnerships
6. Unfunded defined benefit pension schemes

ICBS presented the result of the project on the compilation of second level COFOG data for the general government for the years 2011 and 2012 as recommended during the A1 activity. DST also presented their work with the COFOG classification. Some borderline cases were discussed alongside with focus to look at the aim of the scheme/transaction in question. In relation to this task it was concluded that it would be useful to read the explanations in the budget/account and the underlying laws.

The new preliminary quarterly data on local authorities were presented by ICBS as a result of the Twinning activities, and are planned to be published in 2015.

2 Background

The ICBS is responsible for Government Finance Statistics (GFS) and for the General Government statistics in the SNA framework. There are complete GFS data for the central government and the National Insurance Institute. Cooperation between the ICBS and the Ministry of Finance has improved in recent years, but further streamlining of data exchange is possible. The Ministry of Finance is using a new Enterprise Resource Planning system, which has enabled the improvement of the quality and international comparability of government accounts. However, some problems and gaps exist, including coding of expenditures in the budget and being partly cash-based instead of accrual-based recording of revenue and expense.

At present, full non-financial accounts are prepared for the General government, while the financial accounts cover only central government.

The quarterly accounts need to cover also local government. ICBS needs to decide how to collect and integrate information for these additional sectors in order to produce complete General Government Accounts.

ICBS has come a long way in implementing international recommendations and definitions for Government Finance Statistics, but the practical application of these recommendations and definitions have raised some questions, which needed to be discussed during the Twinning project.

3 Conclusions and Recommendations

3.1 MR1

The following recommendations related to MR1 have been provided during the project:

- a) As the quarterly data for local government are very important for the completion of General Government accounts, it is recommended using the non-audited quarterly data from the local government units which are available at (t+60). Israeli local authorities report their preliminary quarterly reports to the Ministry of Interior. *Ministry of Interior took part in the A1 activity and possible ways for establishing of data channels have been discussed.*
 - b) The establishing of a joint Working Group between the Ministry of Interior and the ICBS. The Working group should include the participants from the ICBS: the Macro Economic statistics department, the Department of Infrastructure and the participants from Ministry of Interior: the Auditing unit, the Budget unit and the Research and Information unit. *See above.*
 - c) Using the outside assistance from the Ministry of Interior in the validation of data, both in order to save time and to improve the quality of the data of the macro economic statistics, by using the expertise of others. *See above.*
 - d) Compilation of the second level COFOG statistics for the General Government on an experimental basis and presenting the results to the experts of the (later) A3 activity. *Compilation initiated, see below.*
 - e) Danish budget data on expenditures are mostly recorded on accrual basis. In some transactions it is acceptable to use the commitment basis as a proxy for the accrual basis of recording. *ICBS will check the possibility with the MoF to use the budget data on commitment basis as a proxy to the accrual basis.*
- (a) There are statistical discrepancies between net lending /borrowing from non-financial accounts and net lending/borrowing from financial accounts. In Denmark these discrepancies are balanced by adjustments of accounts payable/receivable. *ICBS is interested in learning more about the possible solutions for the existing statistical discrepancies in its quarterly GFS accounts.*
- (b) Regarding the consolidation process, it was recommended to build the consolidation matrixes in order to compare the transfers from two sources. The data from the most reliable sub-sector are used and the differences are balanced by adjustments of other items such as purchases and other transfers.

3.2 MR2

The following recommendations related to MR2 have been provided during the project:

- a) The experts of the A3 Twinning activity have recommended drafting a document which states the responsibilities and requirements between the MoF and the ICBS. *In the future this document will be an annex to a formal Memorandum of the Understanding agreement between the two institutions which is under the responsibility of C component of the Twinning project as a part of the National Statistical System.*
- b) Producing a supplementary table which will include the figures for liabilities for the unfunded defined benefit pension schemes in Israel. Since there are no estimates on these liabilities, it was recommended to investigate using the Freiburg model for the

estimation of the liabilities for these unfunded pension schemes. If it is not possible, the MoF estimate of the liabilities must be used – possibly with adjustments, if MoF detailed data is available. *The investigating of the Freiburg model is a long and complicated process. This issue will be checked and possibly implemented in the future.*

- c) The estimation of the imputed pension contributions for the local government (S.1313) should be analysed and the model used for central government should probably be used for the local government. *Data availabilities from the Ministry of Interior should be investigated, along with the possibility of receiving data directly from the municipalities.*
- d) Investigating the public private partnerships to ensure a correct classification, both in relation to allocation of the majority of risk and distinction between PPPs and other cooperation projects between government and private entities. *This issue will be checked and possibly implemented in the future.*

4 Implementation of the mandatory results – sources and methods

4.1 MR1

4.1.1 Compilation of the second level COFOG statistics.

The General Government sector in Israel includes the government ministries, the National Insurance Institute, national institutions, local institutions, and public non-profit institutions. The General Government expenditure is estimated by the analysis of the Accountant General's budget performance reports, and of budget provisions. In addition, complementary data received from the Ministry of Finance and the Ministry of Defense is used. The estimate of expenditures of local authorities, national institutions, and non-profit institutions is based on data obtained from analysis of their financial and budget accounts. CBS produces the General Government expenditure cross-classified by the first level of COFOG and the SNA codes and as well as by GFS codes. As a result of the recommendations provided during the Twinning project, ICBS has started to compile the second level COFOG statistics.

The expenditure by the second level of COFOG is compiled separately for each sub-sector of the General Government as listed above. The cross classification (SNA, GFS and COFOG) has been applied for each sub-sector of the General Government. The second level classification is based on the "Manual on sources and methods for the compilation of COFOG statistics" of Eurostat which provides the comprehensive explanations, case studies regarding the assigning the appropriate function as well as recommendations regarding the classification of some specific items such as imputed social contributions, interest and consumption of fixed capital.

Different methodological issues have been raised during the classification process. For example: multi-functional budget items, borderline cases, R&D classification, and classification of the output of the central bank which is recorded under the General Government consumption expenditure according to the new recommendation of SNA 2008 manual.

For the particular functions, such as social protection and environmental protection, the classification is based on the analysis of the SOCX data and SEPA data which are also compiled in the General Government division.

CBS presented the first results of the second level classifications to the experts of the A3 activity as well as the methodological issues during the classification process.

It is important to detail the following classification issues:

1. Imputed social contributions have been allocated by function and sub-function in a consistent way with wages and salaries rather than with unfunded employee social benefits (pensions).

2. Consumption of fixed capital has been allocated by the first level of COFOG using the average structure of the gross fixed capital formation based on the time series. The allocation by the second level is based on the different methods for each government unit: for government ministries, NPI's and Social security the structure of gross fixed capital formation by the second level of COFOG in a given year has been applied; for the National Institutions and Local Authorities the average structure of the gross fixed capital formation by the second level of COFOG based on time series of the gross fixed capital formation has been applied.
3. The R&D expenditure was allocated by the relevant functions of COFOG (01, 04, 07 and 08). Before the implementation of the second level of classification all the expenditure on R&D was classified in function 01.
4. According to the manual, both interest and intermediate consumption in respect of FISIM should be recorded in public debt transactions (01.7). As there is no recommendation regarding the classification of the output of the central bank, this expenditure was classified in the same function (01.7).

The implementation of the second level COFOG classification is very important for the National Accounts:

1. The split between individual and collective consumption expenditure is to be based on the second level of COFOG. Therefore the implementation of the second level of COFOG allowed improving the data on individual and collective consumption in Israel which are based until now mostly on the first level of COFOG.
2. The individual consumption of the General Government is one of the components of the Actual consumption expenditure of households in National Accounts.
3. The classification by the second level of COFOG will enable performing a more accurate transition to ISIC Rev.4 (for the purpose of calculating the GDP by Industry).
4. During the classification by the second level of COFOG the first level classification has been improved.

The first publication of the second level COFOG data is planned for 2015 in the framework of the Statistical Abstract of Israel.

4.1.2 Cooperation with the Ministry of Interior (MoI).

As a result of the A1 activity, ICBS started to receive the preliminary quarterly reports on local authorities from the Ministry of Interior. The data have been analysed and presented to the experts of the A3 activity. The data are already widely used in the Macro-Economic department in the quarterly GDP estimations.

Following the recommendation to establish the joint working group between CBS and MoI, the meeting with the participants from Macro-economic department and Infrastructure department of ICBS and the Budget unit of the MoI took place on 23.06.2014. The purpose of the meeting was to institutionalize the cooperation between the two institutions and to improve the data compiled in ICBS by establishing the joint working group in the framework of constant meetings. During the meeting the needs for the revision of the imputed social contribution model for local authorities have been discussed and the contact person for this issue was recommended. In September 2014, ICBS has drafted the document determining the parameters for the imputed social contributions model for local government.

4.2. MR2

4.2.1 Cooperation with the Ministry of Finance.

The experts of the A3 Twinning activity recommended drafting a document which states the responsibilities and requirements between the MoF and the ICBS. In the future this document will be an annex to a formal Memorandum of Understanding agreement between

the two institutions which is under the responsibility of component C of the Twinning project as a part of the National Statistical System.

A crucial part of the Government accounts which are compiled in the Government Accounts division in the ICBS is based on the data transferred from MoF. The main provider of the data within the MoF is the Accountant General department.

The following table presents the data transferred from MoF to ICBS, by the providing department, type, timeliness and periodicity of data and their uses in the CBS. The table also indicates the way the data is transferred to ICBS and the contact person in MoF.

Table 1. Data from MoF

Department in MoF	Type of data received	Periodicity	Timeliness	Way of transmission	Uses in CBS
Accountant General department	Budget execution – accounting data	Y, Q, M	1 D	Through the information management system	SNA and GFS non-financial accounts
	Budget execution – estimate				
	Budget execution by industry and sector				
	Financial transactions data				GFS financial accounts
	Deficit	M	10D	By mail	SDDS report
Debt management unit	Debt	Q	2.5M	By mail	SDDS report, OECD and IMF debt questionnaire
State revenue division	Tax data	Q	1M	By mail	SNA and GFS non-financial accounts
Capital markets, insurance and saving division	Private insurance data	Y		By mail	SOCX questionnaire to OECD
Wage and Labor agreements department	Employment data	Q	15D	By mail	General government consumption expenditure at constant prices for quarterly GDP estimates

Likewise, the ICBS also supplies General Government data to MoF.

The following table presents the data provided by ICBS to different departments in MoF, by type, timeliness and periodicity of data and their use in MoF. The table also indicates the way the data is transferred to ICBS and the contact person in MoF.

Table 2. Data to MoF

Department in MoF	Type of data provided	Periodicity	Timeliness	Way of transmission	Uses in MoF
Accountant General department	Suppliers and recipients by industry and sector after the matching to the business register in CBS	Q	15D	Electronic "safe" between CBS and MoF	Integrating in to the statement of budget execution by industry and sector
Economics and research department	General Government individual and collective consumption expenditure	Q		By mail with other National Accounts data	Analysis
	General Government deficit	Y	December, 31	By mail	
	General Government expenditure by COFOG	Y	March, 10 August, 16		
State revenue division	General Government tax revenue	Y	1Q	By mail	OECD revenue statistics
International affairs department	The official development aid statistics data(ODA) and report with the description of Israeli aid program	Y	2M, 6.5M	By mail	OECD DAC statistics

6 Impact

6.1 MR1

Compilation of the second level COFOG statistics

The project has given the ICBS a better understanding on several points:

- Correct split between individual and collective consumption expenditure.
- Correct calculation and presentation of the actual consumption expenditure of households (individual consumption of the General Government is one of the components of the actual consumption expenditure of households in National Accounts).
- Better presentation of the General Government expenditures by industries.
- Better presentation of the General Government expenditures at first level COFOG classification.
-

Cooperation with the Ministry of Interior (MoI).

- CBS started to receive the preliminary quarterly reports on local authorities.
- A contact person at the MoI for imputed social contribution model for local authorities issue was recommended.

6.2 MR2

Cooperation with the Ministry of Finance.

Drafting a document which states the responsibilities and requirements between the MoF and the CBS. In the future this document will be an annex to a formal Memorandum of the Understanding agreement between the two institutions which is part of the National Statistical System.

7 Follow-up and sustainability

- There are future plans to regularly publish The General Government expenditures by second level of COFOG from 2015.
- A continued cooperation with the Interior Ministry to receive data for calculation imputed social contribution model for local authorities.
- Use quarterly data that obtained from the Ministry of Interior for calculation a financial account of local authorities.
- Signing of an Understanding agreement with the Ministry of Finance in the future

5 Conclusions

The following outcomes have been achieved as a result of the project:

1. MR1:
 - The General Government expenditure by second level of COFOG has been compiled and is planned to be published in 2015.
 - The General Government expenditure by the first level of COFOG has been improved.
 - Cooperation with MoI has been established, and CBS received data from the Ministry of Interior and data are every quarter
2. MR2:

The annex to the MoU with MoF has been drafted.

MR3 - Twinning activities A4, A.5

Component: National Accounts
Sub-component: Financial Accounts

MR3. Preparation of detailed work plan for development of financial accounts by SNA

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List of Abbreviations

BC	Beneficiary Country (Israel)
BOI	Bank of Israel
CBS	Central Bureau of Statistics (Israel)
DS	Statistics Denmark

1 Summary of the project.

The project included one study visit (A.2; joint with MR1-2) and two missions, A.4 and A.5.

The purpose of the A.4 activity was to make an assessment on the current situation. During the mission the missing information was discussed in details, and several solutions for new possible sources were discussed. Especially to investigate the possibilities to get extra data from the Bank of Israel has high priority. Furthermore a meeting was organized in the Bank of Israel in order to clarify the situation regarding the actual starting point regarding data for the financial accounts as well as possible additional data collection.

The purpose of the study visit to Denmark (A2 activity) was to overview the paper that defines the requests of the CBS form BOI, in order to cooperatively improve national financial accounting of Israel. The quarterly financial accounts were presented during the meeting with the Statistics and Economic department of Danish National bank. The presentation included detailed explanations on data sources, information gaps and the use of the sectorial financial accounts in the central bank.

The purpose of the A.5 was to prepare a detailed work plan for the development of financial accounts according to the SNA. In particular, the activity included a follow-up on work done on data sources for financial accounts, and an evaluation of alternatives sources and methods.

During the A.5 activity, the MS Experts and the CBS staff had discussions on various methodological issues:

- The new questionnaire from OECD regarding institutional investors and the new F.6 instruments and its sub-categories (insurance, pensions and standardized guarantee schemes) especially F.66 (provisions for calls under standardised guarantees.
- Classification issues: Classification of holding companies versus head offices and Classification of construction enterprises.
- The output of insurance companies and pension funds.
- How to treat provision paid to managers of pension funds?
- Calculation of FISIM for Other Financial Intermediaries.

2 Background

The financial statistics are part of the official financial statistics in the OECD countries. In all OECD countries the financial accounts are reported on a current basis.

The CBS continuously publishes national annual balance sheets of the entire economy and balance for each sector since 2001, Quarterly partial balance sheets, including parts of sub-sectors and parts of some assets were provided to the OECD since 2010. Over the years there have been several changes in the national balance reports: new sub-sectors and types of assets were added. Starting as of 2009, calculations are made for both consolidated balance sheets and non-consolidated balance sheets for sub-sectors (until 2009, on consolidated base only).

The financial account is a relatively new activity in national accounting in Israel. Estimates for the financial account of 2010 were compiled and reported to the OECD.

The direct information on the transactions of the different sectors is very limited (exists only for sub-sectors: the Government, the Pensions funds, and Rest of the world). Therefore the national balance sheets are the basis for the financial accounts. The compilation process is

according to balance sheets of a specific asset and an estimate of the revaluation based on the exchange rate or total return index of bonds and shares.

The improvements of the financial accounts will include :

- Improving the quality of the national balances sheet.
- Improving the transaction of the financial account either by collecting direct data or improving the methods of calculation.
- Improving the cooperation between the ICBS and the BOI.

These subjects were discussed during the Twinning project.

3 Conclusions and Recommendations

The following recommendations related to MR3 have been provided during the project:

- i. Missing information:
 - a) Getting more detailed data from the BOI: The BOI could ask the commercial banks to report more detailed information based on the securities in custody. This detailed information could hopefully both contain a split between instruments and sectors.
 - b) Getting more detailed data from Tel Aviv stock exchange.
 - c) The CBS could approach the commercial banks in an informal way to get more detailed data about the securities in custody.
 - d) The CBS could develop its own questionnaire for the households.
 - e) Getting more detailed information on other financial intermediaries (OFIs): CBS suggested making a survey in order to get better data for OFIs (especially for quarterly data). Bank of Israel supported this idea. The staff from CBS should see what the options (and budget) are for doing such a survey.
- ii. Methodological issues and discussions:
 - a) Whether the provident funds should be located among other financial intermediaries or insurance and pension was discussed. In the consultants' opinion there is no collective element: when a member dies, all the money goes to the heirs and not to the other members of the fund. Furthermore, there is no risk pooling - what the employee (and the employer) pay is allocated directly to the employee's account in the fund. It is the view of the consultants that the money should be allocated among other financial intermediaries. The MS Experts recommend that the liability of the provident fund to households should be classified as other deposits (F.29) since it can be seen as a long term deposit.
 - b) The case of branches of Israeli commercial banks located abroad was discussed. If these are pure branches, they should be excluded from the Israeli financial accounts. This is a very difficult task since the information of the branches is normally included in the figures of the local bank. The separation can be difficult because often the information is little or none at all.
 - c) It was discussed that ICBS could try to make monthly estimates on revaluations on loans and deposits denominated in foreign currency and part of the securities in order to get more precise estimates. At the moment it is done on a yearly basis.
 - d) The current calculation of unquoted shares in the non-financial corporations was discussed. The consultants believe that the method applied by CBS is rather good but that it could maybe be improved. The calculation could be done on industry level since different industries are behaving different in the market, and maybe CBS could make a liquidity adjustment by excluding the most traded company from the stock exchange.
 - e) It was discussed how to treat off-balance sheet credit. Example: the bank connects between the government and the household by transmitting credit from one to another. In the view of the MS Experts this shouldn't appear on the balance sheet (in

the financial accounts) of the bank, but rather directly between government and households.

- f) The output of insurance companies and pension funds was discussed. In Denmark it is calculated from the cost side, because when the ESA95 procedure is used, it leads to very volatile results, which doesn't seem to reflect reality. CBS will look at the possibilities of calculating the life insurance from the cost side.

4. Implementation of the mandatory results – sources and methods

i. Missing information:

- a) Cooperation with the Central Bank- A document has been prepared and sent to the BOI on October 2013, including information about the importance and uses of financial statistics, an overview of the CBS financial statistics and the requests of the CBS to the BOI. Meeting was held in February 2014, to discuss the main points raised in the document.

Main decisions obtained:

- Collection of detailed data of the securities in custody from the commercial banking system should be obtained for each security, allowing identification of the issuer and the holder.
 - Getting more detailed information on the "Other Financial Intermediaries" sub sector.
- The above two issues will be discussed as part of the bank's work plans for 2015.

It was decided to have more discussions about coordination of statistics and financial data processing and distribution between the BOI and the CBS.

- b) Getting more detailed data from the stock exchange- CBS obtained Stock Exchange data about issuance, redemption, dividends and principal payments of quoted securities enabling us to calculate the transactions (by sector) from the issuer side.
- c) Securities in custody - As recommended, CBS approached the commercial banks, in an informal way, to get more detailed data about the securities in custody. Currently, CBS is waiting for final responses from some commercial banks on this issue.
- d) Household's questionnaire -In the short term a survey is not possible because of budget constraints. The issue will be re-examined in future years (if CBS receives data from BOI the need of a questionnaire will decrease).
- e) Getting more detailed information on other financial intermediaries (OFIs)- BOI is currently examining the possibility of conducting a survey in order to get better data for OFIs.

ii. Methodological issues

- a) Revaluations- the recommendation was to make monthly estimates (instead of yearly) on revaluations for loans and deposits denominated in foreign currency, and part of the securities held by the public.

CBS succeeded to calculate loans and deposits on a quarterly basis as monthly data were not available by sector.

At present, only annual data are available for holding securities by sector.

- b) Unquoted shares of the non-financial corporation sector (stock)-

The recommendations were that the calculation could be done on industry level and to make a liquidity adjustment by excluding the most traded company from the stock exchange.

CBS could not make the calculation on an industry level because data on unquoted shares of the non-financial corporation sector by industry are not available.

In order to evaluate the unquoted shares we use the ratio of market value to own funds for the quoted shares. In order to reflect more accurately these shares, CBS build this ratio by excluding the companies with the highest market value (TA 25 index). There is a partial overlap among the highest market value companies and the most tradable companies; CBS also reduced the calculated market value of the unquoted shares by 5% for liquidity adjustment.

- c) A full adjustment was made for the “Rest of the World”, according to the Balance of Payment data, both for the transactions and the positions.

5 Impact

- The project contributed to the improvement of Israel's financial statistics. The financial accounts were considerably advanced and starting from 2015 will be publicized regularly.
- Cooperation with BOI - new data which will be received as a result of the new understanding with the BOI should enable detailed quarterly reports of both the financial account and the national balance sheet. The quality of the financial account and the national balance sheet will be improved especially for the non-financial sectors.
- Transition to the new System of National Accounts (SNA 2008) - The exchange of views during the project contributed to the implementation of the new structure of the national balance sheet and financial account especially in the financial sector.
- Transfer to the new classification ISIC, rev. 4. The discussions, in which the Business Register staff of ICBS also participated, will facilitate deciding the new classifications of companies especially holding and head-office companies.

6 Follow-up and sustainability

- ICBS will submit quarterly reports of national balance sheet and financial account
- SDDS (Special Data Dissemination Standard) Plus proposed:
- The SDDS Plus would require a minimum set of internationally comparable sectorial balance sheets, for financial assets and liabilities with a focus on the sub-sector details of the financial corporations, and standard 2008 SNA instrument classification (quarterly data, 1 quarter after the end of the reference period).

7 Conclusions

The following outcomes have been achieved as a result of the project:

- The financial account has been improved by using new calculation methods and improved uses of already available data; annual financial accounts for 2011-2013 (consolidated and unconsolidated) are currently being prepared and will be sent to the OECD during March 2015. For the next years, the CBS will publish the financial accounts a year after the reference year consistent with SNA 2008.
- Cooperation with BOI has been improved; the CBS is waiting for an answer regarding the collection of detailed data of the securities in custody from the commercial banking system by the BOI supervisor of the banks.

This is a detailed work plan for the actual implementation of the difference initiatives in the coming years if BOI will collect detailed data of the securities in custody from the commercial banks:

Work plan	
<u>4/2016</u>	Receiving data on securities from BOI of the first quarter of 2016 and yearly data of 2015 ¹
<u>5-6/2016</u>	Preparing database
<u>7-9/2016</u>	Summaries, examination and comparisons to data already existing for the total economy. Receiving data of the second quarter of 2016.
<u>10/2016</u>	Creating a sectorial distribution of the securities. Receiving data of the third quarter of 2016.
<u>11-12/2016</u>	Preparing the balance sheets and the financial accounts for 2015 ¹
<u>1-6/2017</u>	Receiving data of the fourth quarter of 2016. Preparing the balance sheets for three first quarter of 2016
<u>6-12/2017</u>	Preparing the yearly balance sheets and yearly financial accounts for 2016
<u>Following years</u>	Publishing the financial accounts a quarter after the reference quarter

¹ If the data for 2015 will be available

MR4 - Twinning activities A6, A.7, A8

Component: National Accounts
Sub-component: Balance of Payments

MR4: Detailed working plan for the development of financial accounts in the BoP.

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List of Abbreviations

BC	Beneficiary Country (Israel)
BoP	Balance of Payments
BoI	Bank of Israel
BPM6	Balance of Payments Manual, 6 th edition (2009)
DN	Danmarks Nationalbank (Central Bank of Denmark)
DST	Statistics Denmark
FDI	Foreign Direct Investments
ICBS	Central Bureau of Statistics (Israel)
ITRS	International Transactions Reporting System
MS	Member State

1 Summary description of the Twinning activities

The Twinning project included one study visit and two MS Expert missions to ICBS and Bank of Israel regarding the project's Balance of Payments (BoP) sub-component.

The two MS Expert missions to Israel primarily dealt with Foreign Direct Investments (FDI) and the International Investment Position (IIP) statistics. Both missions included sessions in ICBS and BoI.

The first mission was implemented in July 2013, and was considered a fact-finding mission. Participants from the Israeli Ministry of Finance took part in some of the sessions. Both the Israeli and the Danish reporting mechanisms (and questionnaires) were discussed and compared. Critical issues from the methodology, as outlined in the most recent BPM6 manual, were discussed – among them the questions of the Ultimate Control Owner, distribution by geography and by industry, and FDI related to real estate. Recommendations were provided for consideration by BC (see below).

The second MS Expert mission took place in October 2013, and continued the work from the first mission, outlining different projects to undertake in both the short and medium run term as well as the longer term. In addition, the topic of investment income from FDI was discussed. Recommendations from this mission are reflected in section 4, below.

The study visit to Statistics Denmark and Danmarks Nationalbank had a particular focus on FDI and IIP statistics, as well, but also covered the whole set-up of the Danish BoP system, including the strict coordination between the Balance of Payments and the National Accounts. The highly coordinated revision policy ensures that these two statistics are consistent, at any time. Sessions on some of the closely related statistics on foreign trade in goods and foreign trade in services were undertaken. Separate sessions were devoted to the strategy applied by Danmarks Nationalbank on having enterprises reporting whole identities on not only FDI but also other important BoP items, and to the applied IT-solutions based on highly automated procedures.

2 Background

The BoP and the International Investment Position (IIP), the FDI and the revenue from the FDI are produced and published by the ICBS in close cooperation with the Bank of Israel. The Bank of Israel also publishes the IIP. Problems exist with the non-financial sector in the Balance of Payments. Also, some data for the financial sector are not completely available and information about flows is missing. Increased cooperation between the Bank of Israel and the ICBS, and collection of data at the ICBS in addition to or instead of the banking data could fill some of the gaps.

3 Conclusions and recommendations

Following the conclusions of the activities, these recommendations were provided and accepted by ICBS and BoI.

FDI positions and threshold for current direct reporting:

- 1.** The overview tables shown in Annex A7.4 (mission report A.7) would provide a good overview and a basis for starting the considerations regarding the future thresholds. The tables should be filled in for the FDI positions data, i.e. the directly reported part plus the cumulated ITRS data, this way equalling the officially published FDI position figures. In addition, the data on FDI stock reported to the experimental FDI survey (which in effect should be a subset of the before-mentioned cumulated ITRS data.
- 2.** The method of cumulating ITRS data as a means of covering the non-reporting enterprises should be reconsidered. The filled-in tables suggested in Annex A7.4 will give an indication of the distribution on size groups after which it can better be decided to what extent sampling of the small and medium sized enterprises (FDI relations) should be covered.
- 3.** Regarding the late responses for the quarterly IIP it is the MS Experts' recommendation that measures should be taken in order to have at least half of all enterprises' reporting when calculating the IIP, and among them the clear majority of the most important enterprises' data. In Denmark, the experience is that direct contact with the management of the enterprises in question (with the purpose of offering help in order for the enterprise to be able to report in time) has been successful.
- 4.** It should be considered to ask the enterprises to report about all their FDI relations if the enterprise has been chosen to report.

Surveying small and medium sized enterprises for FDI:

- 5.** Ideally, and for practical reasons, only one survey would cover the whole population. The method could be either stratified sampling or a cut-off method. In the case of stratified sampling, the whole population would be divided into suitable strata and representative samples drawn within each strata. This way, the non-reporting enterprises would be covered through real grossing-up of the data. In the case of the cut-off method, only the bigger enterprises would be reporting, and the totals for the non-reporting enterprises would rather be estimated on basis of other available information – possibly using ITRS information, but a better source would normally be the information from private data suppliers, for example Bureau van Dijk or Dun & Bradstreet.
- 6.** If the reporting on FDI will be split between the Bank of Israel and CBS, the latter handling the small and medium sized enterprises in yearly or bi-yearly surveys and in accordance with the ICBS's methodological and budgetary decisions, the information should be comparable. The questioners should be designed especially for the small companies, this would be the smaller and clearer questioner as an attempt to minimize the report burden. Obviously, the two populations should be selected carefully as not to have any systematic double- or under-reporting.
- 7.** It is recommended not to have a grossing-up element larger than approximately 10 per cent. The distribution of the grossing-up part of the data on countries and industries may be

done using the information on the directly reported data. This is the case in Denmark. It is, however, a matter of judgement whether it may be better to leave this part of the statistics un-allocated with respect to geography and industry.

Methodological issues:

8. The information on Ultimate Beneficiary Owner (Ultimate Control Owner) should be made compulsory to answer as this is crucial for the implementation of the directional principle in the published statistics.

9. The formulation of the questions on the reporting forms should be considered to be more in line with the accounting terminology well-known to the reporters, rather than the statistical terminology.

10. Regarding the ITRS, better instructions for the commercial banks (“the tellers”) could be developed in order to improve the quality of the reported data. Generally, a reduction of the number of transaction codes could improve the quality of the ITRS data.

FDI investment income:

11. An important improvement to the current process will be to separate the directly reported dividend data regarding FDI, and that the Bank of Israel sends this data to the CBS for their grossing up – as is already the case of aggregated profits.

12. The grossing-up element of the FDI income seems very large, especially on the inward side. Following the analysis suggested above, i.e. the tables of Annex A7.4 (of mission report A.7), the size of the grossing-up may be better evaluated. The choice of a new threshold (and surveying method) should also take the effect on the investment income into account.

Real estate

13. The new data sources, i.e. the data on inward transactions in real estate from the tax authorities, and the stock data on real estate from the building and dwelling register, should be analysed carefully. Annex A7.5 (from mission report A.7) describes a first, very simple example of this analysis. This method should be developed further, especially regarding the necessary assumptions.

14. In particular, the information in both data sources on the residence of the buyer/holder should be examined. At the outset of the analysis, it is assumed that residents report their Israeli ID no. to both registers, while the passport information as the alternative option is used only by non-residents. For the cases where the buyer/holder has both options, the incentives for the buyer/holder to use either piece of information should be clarified.

15. The model for the inward FDI should for Tel Aviv and Jerusalem should be extrapolated to cover the whole country. There is a need to examine the extrapolation process methodologically, to re-examine the model and to add the sales of the foreign residents back to residents on the inward side and to check up the figures with the major municipalities.

16. Other assumptions, for example on the best price index, should be analysed.

17. Simultaneously with the initial analysis, it would be beneficial to involve external experts to help review the preliminary results. This could be colleagues from the Tax Authorities, the bigger municipalities or the Ministry of Housing.

18. Regarding the outward FDI in real estate, reliable data sources must be identified. Currently, neither inward nor outward positions are published or reported to the international organisations, but a possible publishing of inward FDI must, for reasons of symmetry, be supplemented by outward FDI positions regarding real estate. Among the possible data sources regarding outward FDI in real estate are the ITRS, but additional information might be available if real estate brokers, specialised in Israelis acquiring real estate abroad, were interviewed. In the longer run, it could be considered to include a question in the Household Budget Survey on “*does your household own real estate abroad?*”

19. Following the development of a methodology for both the inward and the outward FDI in real estate (positions and transactions), it should be investigated how to estimate the income element related to the investments.

4 Implementation of the mandatory results – sources and methods

Follow-up on threshold issue:

Analyses conducted during the Twinning project of the present reporting on FDI showed that around 97 per cent of the FDI positions are covered by approximately 300 enterprises. At the same time, the very high number of late responses to the FDI statistics gives rise to frequent and occasional large revisions of IIP.

A new policy towards data reporters has been planned according to which emphasis will be put on the enterprises timely reporting to the Bank of Israel. The implementation of this data providers' policy is expected to be labor intensive and time consuming. Accordingly, and in the light of the high coverage obtained from the most important enterprises, it has been decided that starting from 2015 only 300 enterprises will be surveyed.

The analysis of the ITRS data indicates that between 79 (inward) and 95 (outward) percent of the FDI flows are reported to BoI.

In the longer run, it will be considered to ask the enterprises to report on all their FDI relations.

Follow-up on small and medium sized enterprises:

An ICBS pilot regarding small and medium sized enterprises was initiated in 2014. The purpose was to start the procedure of being able to conclude on the importance of the small and medium sized enterprises for the total level of FDI, ingoing as well as outgoing. Thus, following the pilot a full-blown sample survey would be planned for.

However, it soon became clear that the quality from the pilot would be insufficient, and the pilot was terminated. Instead, the further planning regarding the small and medium sized enterprises' possible engagement in FDI relationships will begin with a careful analysis of the reasons to the break-down of the pilot in which specific attention will be given to:

- (i) the quality of the ITRS based population and use of quality-improving additional sources, e.g. Dun & Bradstreet;
- (ii) the quality of the questionnaire, including direct involvement of enterprises that took part in the 2014 pilot in order to get their input to what makes an understandable questionnaire, i.e. to get high-quality answers.

The results from the analysis should be used to plan the next pilot to be implemented in 2017, and the results from the pilot will in turn be used to plan for a full-blown sample survey in 2019 of Israeli small- and medium-sized enterprises.

Follow-up on methodological issues

Bank of Israel has decided to redesign their questionnaires so as to collect information on the Ultimate Control Owner on a non-voluntary basis (for the reporting enterprises).

The weaknesses of the ITRS applied by BoI are acknowledged, but the ITRS will remain as an important source to maintain the population (the ITRS also serves other important functions for the daily monetary policy in Israel). In a long-term perspective, the present data collection based on direct reporting from the enterprises will be further developed with much more automated procedures. This requires, first of all, a whole new IT-infrastructure.

During the Twinning project, BoI has implemented a number of improvements related to the data collection methodology regarding FDI, such a redesign of questionnaires within the limits of the present technology, Furthermore, important work has been done related to other important parts of the BoP system, e.g. regarding institutional investors.

Follow-up on FDI investment income issues:

The historical reasons for the large grossing-up element regarding the incoming investment income from FDI will be evaluated, and if necessary a new methodology will be developed even in the short to medium term. In the longer run, the results of the sample survey of small and medium sized enterprises should provide better estimates.

The procedures and division of labor between BoI and ICBS will be adjusted: the directly reported dividends will be sent separately and directly to ICBS.

Follow-up on FDI in real estate

The model outlined during the A.7 mission has been developed and tested including 8 quarters of data. The model, including the assumptions and the results, has been documented in a paper. The inward FDI data and the incentive structures regarding the passport vs. ID no. should be analyzed further. It should be possible to identify (in the Building and Dwelling Register) real estate units that cease to belong to non-residents, and to analyze if the explanation partly is because the non-residents become Israeli citizens.

Known improvements to the methodology, for example improving the current linear projection on quarters, will be implemented, and the transactions data will be tested for their usefulness as a grossing-up factor. The next four quarters will be added to the model (2013 /2014 data) to the model, and back-data methodology will be developed.

The ITRS information on real estate transactions will be evaluated. Other options include use of mirror data (from other statistical offices). A survey among Israeli real estate brokers specialized in selling real estate abroad will be considered.

5 Conclusions

During the Twinning project many quality-improving initiatives were planned and/or implemented. The work will continue during the coming 2- 5 years and depending on the human resources and budgetary limitations, improving the data collection so as to obtain an overall better coverage of the total population regarding FDI and IIP.

The co-operation between ICBS and BoI was further strengthened during the Twinning project – both regarding an improved common understanding of the joint system and regarding a common strategy as to what parts of the BoP/IIP system to prioritize during the coming years.

The implementation of the outlined plans will contribute to the completeness of the IIP statistics and general improvement of the quality of the BoP statistics of Israel.

MR5 and MR6 - Twinning activities A.9, A.10, A.11

Component: National Accounts

Sub-component: Welfare Accounts

MR5: Definition of indicators on the provision of welfare services

MR6: Definition of the structure of a satellite account on welfare, presenting expenditure and financing of welfare by sector

Implemented by:

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List of Abbreviations

BoI	Bank of Israel
CBS	Central Bureau of Statistics (Israel)
ESSPROS	European System of integrated Social Protection Statistics
MS	Member State
MoF	Ministry of Finance
MoSP	Ministry of Social Protection
NII	National Insurance Institute
NIS	New Israeli Shekel
NPI	Non-Profit Institutions
SOCX	Social Expenditure Database (OECD)
HES	Households Expenditure Survey
LFS	Labor Force Survey

1 Summary description of the Twinning activities

The main objective of the project was building a welfare satellite account for Israel. Mandatory results and benchmarks related to this activity were defined as follows:

Mandatory results	Benchmark
MR5: Definition of indicators on the provision of welfare services	Indicators on provision of welfare services
MR6: Definition of the structure of a satellite account on welfare, presenting expenditure and financing of welfare by sector	Structure of satellite accounts on welfare

In the process, it was helpful to learn from Denmark (a Member State) who is producing welfare accounts and discuss the methodology. It is important to mention that welfare satellite accounts should be adjusted to the specific country, and is not a direct outcome of the ESSPROS or SOCX data sets.

As a result of the meetings between the Danish experts and the Israeli partners, a first welfare satellite account was built and presented, as well as some indicators calculated.

A short questionnaire was presented aimed at the business sector to gather more detailed data on the revenues from welfare services.

A Steering Committee was established and is planned to continue its work.

The main recommendations (more details below - conclusions) were to continue elaborating the definitions, to present more tables and more indicators. The need for non-financial data was stressed, namely the number of employees in welfare by education, and the number of clients, by type of service.

2 Background

The discussions which included external partners of ICBS indicated that there may be some need for harmonization of definitions – or rather the interpretation/understanding of these definitions.

It was from both ICBS and external partners (Bank of Israel, Ministry of Social Protection, National Insurance Institute, the Hebrew University) agreed that the share of the welfare services provided and financed by the private sector is big and increasing in Israel.

So, while the coverage of the already existing welfare statistics was basically good and in accordance with international standards and requirements, a satellite account on welfare could include additional information. Such accounts would, as compared to the current system, first of all include the following elements:

1. Welfare services not organized through collective schemes by government and/or collective agreements, in particular welfare services provided and financed by the private sector and households.
2. Physical information, first of all employees in the welfare sector (both Government and private) and the number of beneficiaries (clients) by type.

The explicit distinction between expenditures and financing could also be introduced in the welfare accounts, as it is the case with the ESSPROS system of the EU.

3 Recommendations

The MS Experts' most important recommendation was to work on the definitions and the delimitation of the welfare concept.

Not only social protection in a narrow manual meaning of the word, but probably also other kinds of insurance, assistance etc. related to social welfare. In practice, this could imply the development of a "positive list" – i.e. a list of all the "areas" that are positively going to be included within the satellite accounting framework. Israel consulted the steering committee which concept of welfare is of interest and their opinion was to include all conservative areas and exclude more general data like pensions. For the time being and in order to be flexible with the data, Israel calculated the data in such a way that inclusion or exclusion of pensions is very easy to be done.

Parallel definitions (criteria) are described in SNA2008, Chapter 8, paragraphs 8.17 and 8.65

8.17. Social benefits are current transfers received by households intended to provide for the needs that arise from certain events or circumstances, for example, sickness, unemployment, retirement, housing, education or family circumstances. Social benefits may be provided under social insurance schemes or by social assistance.

As for the development of the welfare accounts, the level of detail (breakdown) with respect to sectors and types of beneficiaries (clients) could be inspired by the EU/ESSPROS methodology. In particular, it is recommended to consider the financing dimension of the ESSPROS system.

As a result of the discussions in the study visits and in the steering committee, some recommendations were taken into account and implied :

1. The use of SOCX as the main source for Government data.
2. The use of COFOG classification for the type of activity in Government and Local Authorities.
3. Exclusion of Health data and Education data, already included in other satellite accounts.
4. For the final presentation of the welfare account, using a mixed classification for the type of activity, based on COFOG and ICNPO (The handbook of classifying Non-profit Organizations).

4 Sources and methods

Present (known) ICBS sources

1. household expenditure survey (HES)
 - a. contributions to pension schemes (both from household and from the employer)
 - b. payments from the pension funds
 - c. number and types of clients by sector
 - d. contributions and payments by welfare categories (purpose)
2. trade and services in the non-financial sector
 - a. expenditure by types
 - b. turnover and number of employees
 - c. all 6,500 broken down by ISIC rev.4 digit level and size groups
3. labor force survey (LFS)
 - a. number of employees by sector
4. social survey
 - a. number of volunteers and hours produced

5. NPI survey (private and governmental)
 - a. expenditure by type by welfare group
 - b. income by type by welfare group
 - c. number of employees by welfare group
6. NPI employees and clients (collaboration with the Hebrew University)
 - a. Number of employees and number of clients by welfare group
7. Employment data from NII
 - a. Number of employees by ISIC rev.4
8. Central and local government sector (administrative data)
 - a. expenditure by type
 - b. income by type
 - c. number of employees

DIMENSION	Expenditure	Income (financing)	Type of employees	Type of beneficiaries
SECTOR				
Business	Trade & Services survey (CBS)	Trade & Services survey (CBS) SOCX (CBS, MoF)	LFS Business Register	HES (CBS)
Government (Central, Local, Gov. NPIs, NII)	SOCX (CBS, MoF)	SOCX (CBS, MoF)	LFS	HES (CBS)
Private NPIs	NPI survey (CBS)	NPI survey (CBS)	NPI survey (CBS) LFS (CBS) Hebrew University	HES (CBS)
Household	HES (CBS)	HES (CBS)		HES (CBS)

5 Impact

The impact of the MS missions was remarkable. These visits gave us a deep understanding of the complexity of the account, of the differences between the SOCX and ESSPROS, and helped us decide upon crucial issues, concerning methodological problems. We could go forward and "fine-tune" our definitions of the satellite account of welfare, in such a way that our outcomes are far ahead of most other countries, and we can present a whole satellite account, using all the experience we gained from the twinning project. The Steering Committee is still active, and has created a network of researchers interested in the subject.

7 Follow-up and sustainability

We decided to make an effort and present the main 4 tables of the satellite account in the 2015 yearbook of ICBS:

1. National expenditure on welfare, by performing and financing sector.
2. National expenditure on welfare, by performing sector and type of activity.
3. National expenditure on welfare, by performing sector and type of costs.
4. National expenditure on welfare, by financing sector and type of activity.

We were able also to calculate the main welfare indicators and all this information will be presented in the new web site of the CBS, in a separate page, in 2015, along with diagrams, methodology, definitions, sources etc.

Our next step will be publishing a special publication on the "National expenditure on welfare" for the year 2011-2012, at the end of 2015 or beginning of 2016.

The Steering Committee is accompanying us along 2015, until the publication of the special report. As a consequence of this project, we were invited to give a lecture about this topic in the Ministry of Welfare to their research department, and they invited the colleagues from the research department of the national security as well as the researchers of the Taub research center.

Our challenges for the next year are to perform a short survey of the business sector, which will provide us with better data on the distribution of income and on man-power and beneficiaries (receivers of welfare services), by type of activity. In collaboration with the Center of philanthropy of the Hebrew University of Jerusalem, we plan to receive similar data for the Non-Profit sector.

6 Conclusions

The structure of the Welfare Accounts, to be suggested to the Steering Committee, will be based on the SOCX, however:

- In contrast to SOCX, the Welfare Accounts will also include the financing and performing of the Welfare services (per definition total expenditure must equal total financing).
- The scope of the Welfare Accounts is broader, primarily because of inclusion of the financing of the private sector (social domain in SOCX vs. welfare concept of the the Welfare Accounts).
- In the longer run, the Welfare Accounts will, besides the financial information to be published in 2015, also include information on personnel (staff) and clients (beneficiaries).

Two major differences in types of services between SOCX and the Welfare Accounts are:

- the Health sector – currently only included in SOCX and not in Welfare account.
- Old Age pensions – currently only included in SOCX and not in Welfare account.

Minor adjustments between SOCX and Welfare Accounts:

- Administrative costs, negative taxes, education of 4-6 year olds is not in Welfare accounts (included in satellite account of education).
- Use of sub-categories within the overall structure to highlight specific services in the Israeli welfare system.
- Final decisions will be taken by the Steering Committee.

- The "Other costs" (one of four components of the total expenditure) should be given another name, and, if possible, broken down.
- Maybe the Social Survey can, in time, provide valuable information to the Welfare Accounts.
- The three/four indicators are good and meaningful – the indicator "households' share of total financing" would be interesting as well.
- Continue the comparative list of COFOG/SOCX/Welfare Accounts regarding the differences between the "classifications".
- Documentation of the known differences between next year's publishing of the COFOG level 2 data and the Welfare Accounts.
- Continue co-operation with external partners, in particular the Hebrew University regarding the survey on the non-profit institutions, the Ben Gurion University's research project on employees in the non-profit sector should be analyzed.
- Develop the ICBS questionnaire regarding the business sector, including thorough pre-testing.
- Do some face-to-face interviewing with 3-4 enterprises in order to test the quality and general understanding of the questions.
- The information from the LFS and from the Trade in services survey should be analyzed.
- The TAX information on employees' salaries combined with information on businesses could be analyzed to estimate the number of persons (heads) working in the welfare sector.
- Possibly an analysis of the amount and types of welfare services provided by contractors could be conducted.

Achievement of mandatory results:

MR5 - Indicators on provision of welfare services - Proposed list of indicators (provisional - to be further discussed in the steering committee):

1. Total expenditure on welfare as percent of GDP.
2. Total expenditure on welfare per capita- in NIS and \$PPP.
3. Government expenditure on welfare as percent of total expenditures of the government.
4. The share of households in financing welfare services

Israel has calculated and presented the above indicators for key stakeholders during the Twinning project, for the year 2011.

MR6 - Definition of the structure of a satellite account on welfare, presenting expenditure and financing of welfare by sector

Israel presented the first results of the satellite account of welfare in Israel in 3 tables, and the methodology relevant to these tables:

Table 1 – National expenditure on welfare, by performing sector and by financing sector, 2011.

Table 2 – National expenditure on welfare, by performing sector and by type of activity, 2011.

Table 3 – National expenditure on welfare, by performing sector and by type of expenditure, 2011.

MR7 - Twinning activities A.12, A.13, A.14

Component: National Accounts

Sub-component: Environmental Accounts

MR7: Definition of the structure of waste and air environmental accounts

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List of Abbreviations

AEA	Air Emission Accounts
CEPA	Classification of Environmental Protection Activities
BC	Beneficiary Country (Israel)
C&D	Construction and Demolition
CBS	Central Bureau of Statistics (Israel)
EA	Environmental Accounting
EPE	Environmental Protection Expenditures
EU	European Union
EW-MFA	Economy-wide material flow accounting
GHG	Greenhouse Gases
Moe	Ministry of Economy (Israel)
MoEP	Ministry of Environmental Protection (Israel)
MOU	Memorandum of Understanding
NAMEA	National Accounting Matrix including Environmental Accounts
MS	Member State
PRTR	Pollutant Release and Transfer Register
SEEA	UN System of environmental-economic accounting
SU	Industry Survey of ICBS
SY	Social Survey of ICBS
UN	United Nations

1. Summary description of the Twinning activities

The project included two MS Expert missions to ICBS (A12 and A13 activities) and one study visit (A14 activity).

During the A12 mission, current status and challenges of environmental statistics and accounts in Israel were presented and discussed, as well as characteristics, components, classifications and implementation of the UN and EU environmental accounting frameworks. Waste statistics and accounts and air emission statistics and accounts in Israel were analyzed and discussed at detailed level, and the CBS prepared summary tables on data availability and on waste and air emissions for environmental accounting purposes. Basic data and statistics of the CBS and the Ministry of Environmental Protection on waste and emission to air were found to offer good starting points to develop waste statistics/accounts and air emission accounts according to the main standards of environmental accounting framework of United Nations and the European Union.

The A13 mission focused on air emission accounts and waste accounts, and with respect to these subjects also general features and differences between NAMEA and SEEA framework were discussed. As an international recommendation and statistical standard the SEEA gives flexibility to its implementation at national level, and clearly indicates that physical supply-use and input-output approaches can be focused on branches of economic activities and material groups and types that are of the most importance in Israel.

The study visit to Finland (A14 activity) was aimed to share the experience of Statistics Finland in the development of environmental accounts in the field of energy, air emissions, greenhouse gases and environmental protection expenditures (EPE). The CBS is at a starting point of developing several environmental accounts and some elements are required in the development process.

Structures of environmental accounts were presented, as well as the components of environmental accounts and the required information for constructing them. Different methodologies were shown and the differences between them were elaborated. A tool was presented to analyze the relationship between material flows, the environment and the economy.

Integrating various data sources into a harmonized system– the construction process of environmental accounting was introduced: The different sources of information and how to combine them together; the difficulties that were encountered in Israel and the alternative solutions as they emerge from the experience in Finland.

Presentation and use of information - Environmental accounts are intended to inform the public and provide information for decision makers. The publications of Statistics Finland present the information on the environmental accounts and the indicators which were constructed to examine the environmental conditions within a comparative framework.

2. Background

2.1. Environmental Accounts

The CBS is responsible for the calculation and dissemination of environmental statistics, including air emissions, GHG, waste, water and wastewater, EPR and biodiversity. In recent years the need to integrate these statistics into an economic framework has increased. The Ministry of Environmental Protection as well as the academia and International organizations promote the development of environmental accounts that present the environmental pressure of the various industries on the one hand, and their efforts to minimize the environmental impacts on the other hand. These accounts enable the calculation of various indicators that form the knowledge base for green growth strategy. The CBS introduced its first water account in 2010 and is planning to develop additional accounts:

a. Air Emissions and GHG Accounts

Data for air pollution (from fuel combustion) and GHG emissions exist in Israel by industry and therefore this topic was selected as high priority for development. The data sources include administrative data, Input-Output data and surveys data. However, some problems and gaps exist, including difference in level of detail, quality and timeliness of data sources and missing data.

At present, emission inventories are prepared on an annual basis, with a breakdown by IPCC sectors, fuels and user sectors. The required air accounts need to detail the data by industry and to cover emissions not only from fuel combustion and IPCC sector activities. The CBS needs to determine how to collect and integrate information from different sources in order to produce a complete set of air and GHG Accounts.

Although the CBS has made progress in implementing international recommendations and improving the GHG inventory and air pollution statistics, some questions remain opened and to discuss them during the Twinning project.

b. EPE

The CBS prepares on an annual basis reports on the environmental expenditure of the public sector and on a bi-annual basis, reports on the manufacturing industries (including electricity). These reports are adapted to international standards. However, there is a need to broaden the scope, include additional sectors, and report additional information, such as environmental taxes, which are not currently collected.

The goal of the Twinning activity was to help define the data sources that can be used to broaden the scope of the EPE in Israel, to learn from the experience of the EU and to adopt new methods to produce better estimates for these accounts.

c. Waste Accounts

Very few EU countries have waste accounts as waste accounts are not mandatory according to EU regulations. During the A13 mission, the BC presented their proceeding in waste statistics and accounts, and the MS had a thorough presentation on experiences and practices of waste accounts in Austria. The different data sources in Israel which are used for producing waste statistics and the remaining data gaps were discussed in detail.

Waste statistics were also covered during the study visit to Vienna in the framework of the ENPI-SEIS project. This study visit dealt with the following topics:

- Electronic data management system (EDM), which manages and controls the waste industry in Austria.
- PRTR data in Austria
- Household waste data in Austria based on waste collection fee that is charged by the number of waste containers.
- Waste incineration technologies in Austria.
- Estimation methods for recycling ratios.

Industrial Waste - comparison between PRTR-data and data from the survey on industrial waste generation in Israel: the PRTR-reporting does not provide a full coverage as only approximately 430 enterprises have to report. The companies have to report their waste transfers on a more detailed level than required by PRTR-Regulation (at the level of waste types, not only aggregated as “total non-hazardous waste” and “total hazardous waste”). The PRTR data are reported at the site level, which makes it difficult to compare them to the CBS data, which are collected at the business unit level. PRTR-data are very useful for

plausibility checks but additional surveys have to be made to achieve a full coverage of (industrial) waste generation.

Waste from agriculture:

A significant progress has been made with respect to waste from agriculture in Israel. A project was launched jointly by the Ministry of Environment and the Ministry of Agriculture. A policy how to handle agricultural waste has been set. Statistical methods for the estimation of certain waste types (e.g. manure³) have been developed.

Construction and demolition (C&D) waste:

In Israel, large quantities of C&D waste are dumped in open areas and are not disposed of in landfills for C&D waste nor pre-treated in dedicated treatment facilities. Furthermore, C&D waste from the renovation of residential buildings are a problem because they are frequently disposed of together with municipal solid waste, thus distorting the municipal waste statistics. The incomplete data on C&D waste only reflect the actual shortcomings in practice. To the knowledge of the MS expert, there is no method for statistical estimation of the amounts of generated C&D waste, although there should be a correlation between economic indicators in the construction sector and the generation of C&D waste.

4 Conclusions and Recommendations

Short-term (1 year, within the Twinning project's life time)

- Formalize co-ordination with MoEP and other stakeholders
 - A regular meeting structure based on a MOU
 - Examination/estimation of the coverage of the data collected and reported by MoEP by waste and emission types. Identification of the main data gaps by the main branches of industry (ISIC).
 - Exchange of information on development and use of emission factor on fuels and other material relevant to emission accounts
- Formulate the longer-term development plan, cf. below

Long-term (3-5 years): possible goals

- Applications of physical supply-use tables according to UN and EU environmental accounting framework
 - Air emission accounts (air emissions by economic activity)
 - Generation of waste by economic activity and by waste type
 - Physical supply-use tables for energy (depends on available resources within the ICBS)
 - Economy-wide material flow accounts (depends on available resources within the ICBS)
- Application of monetary flow accounts
 - Environmental expenditures especially on waste management and air protection

Broadening the scope of environmental accounts

- Israel has compiled water accounts and partial environmental expenditures accounts, and is developing air emission accounts and waste statistics compatible with national accounts. In long term combination of environmental accounting on emissions to air, waste, water, energy and environmental expenditures and taxes would give a relatively comprehensive picture on interactions between environment and economy in Israel. Regular environmental accounts would be very useful especially for ministries on environment, economy, agriculture and national infrastructures and offer statistical data to universities and research institutes that analyse environmental and economic interactions of production and consumption. Although households are

a separate sector in environmental accounts, allocation of physical flows to consumers needs to be done at more detailed level than in environmental accounts.

SEEA and NAMEA frameworks

- Both NAMEA and SEEA frameworks are useful starting points to environmental accounting. The SEEA is recommended by the United Nations and also applied by the European Union, and it is recommended that the SEEA approach should be followed. However, NAMEA and SEEA are not contradictory, and the most parts of the NAMEA are taken into account and included into the SEEA framework. As an international recommendation and statistical standard the SEEA gives flexibility to its implementation at national level, and clearly indicates that physical supply-use and input-output approaches can be focused on branches of economic activities and material groups and types that are of the most importance in Israel.

Breakdown of economic activities

- The basic breakdown for economic activities in environmental accounting should follow the breakdown used in National accounts. The starting point would be at highly aggregated level, e.g. as in the NACE Rev.2 classification of economic activities:

- A Agriculture, forestry and fishing
 - B Mining and quarrying
 - C Manufacturing
 - D Electricity, gas, steam and air conditioning supply
 - E Water supply and waste management
 - F Construction
 - H Transportation and storage
 - G-U Service activities, including public sector
 - Households

- Disaggregation is needed for C Manufacturing, but as well e.g. for H Transportation in case of emissions to air, taxes and energy accounts. Of all main categories from A to G; I_S, more detailed data could be presented by recording the most important branches of industry as 'of which' from the main categories. Disaggregation of the main categories would be a compromise between availability of basic data for environmental accounting, resources available for environmental accounting, reporting practices of National accounts, and needs and views of the main users such as the MoEP, MoE and research community. As far as possible, all data collected for the PRTR register should be allocated to branches of industry at rather detailed level.

Dissemination of environmental accounts

- The framework of environmental accounting and definitions used are often not familiar to potential users of information provided by the accounts. Simplified presentation forms are needed in order to introduce the importance of environmental accounting and improve the usability of environmental accounts. Taking the branches of industry as a starting point in presenting the accounts (physical flows and monetary flows related to environmental matters) along with some environmental and economic indicators which use more familiar National accounts data could make the meaning of environmental accounting clearer to the users.
- There could be an integrated publication that includes environment and supplementary information (economic and demographic) that will enable the production of relevant indicators.
- In allocating air emissions to branches of industry the long term goal would be, that accounts for air emissions, environmental expenditures (especially on air and climate protection) and environmental taxes (need to be developed) could be presented at the

same level of disaggregation. These accounts could then further be combined to economic data provided by the national accounts. Due to the high economic and environmental importance of greenhouse gases, accounts for these gases should be compiled first, and then apply the methodology developed and experience gained to other air emissions.

Cooperation among units and organizations

- Development of the PRTR register, the CBS survey and the CBS monetary input-output tables are in a key position to further development of air emission accounts. Therefore a close and regular co-operation is needed between organizations and units involved. A working group consisting of the ICBS, MoEP and MoE could concentrate on co-operation and co-ordination on data sources and methodologies, clarification of terminology and definitions, future structuring of the accounts and planning of regular reporting from both MoEP's PRTR register and ICBS air emission accounts. Other current and potential data providers and users could be informed regularly, and invited to closer co-operation when needed.
- Analyzing the current and future PRTR data is still among the first priorities. Other data sources, such as the coming new administrative data from agriculture, vehicle register and data on vehicle taxes and voluntary mechanism for companies to report greenhouse gases needs to be examined as well.
- In the long run development of physical supply-use tables for energy would support the air emission accounts and also the compilation of monetary input-output tables. Energy flows are closely related to environmental taxation and environmental expenditures due to air emission from energy supply and use.

Level of aggregation

- In allocating waste generation to branches of industry the long term goal would be, that accounts for waste, environmental expenditures (especially on waste management) and environmental taxes could be presented at the same level of disaggregation. A starting point for disaggregation of waste types could be adapted from the SEEA -type of disaggregation to seven types of waste, and use the 'of which' categories in the national breakdown to more detailed level when needed. In the long run it is recommended, that disaggregation of waste types used in the European waste statistics regulation would be adapted.
- Balancing the generation and treatment (supply-use) of waste faces many difficulties in practical work. These difficulties are caused by e.g. different pre-treatment activities and double counting caused by them, changes in water content of waste during treatment, and different definition of waste in foreign trade statistics than in waste statistics. Therefore it is not recommended to compile full balances between generation and treatment of waste by economic activity and by waste type. Balances can be calculated at aggregated level to ensure that all necessary information on both generation and treatment of waste is available and included into waste statistics compilation system.

4 Implementation of the mandatory results

4.1 The structure of the waste and air accounts

In principle, the plan is to construct the air and waste accounts in the coming 2-4 years, depending on data and resources availability. The accounts will be developed in the most detailed disaggregation level possible. The accounts will follow the SEEA framework.

Air Accounts

The air accounts will cover air emissions and greenhouse gases from fuel combustion only. Currently the available data sources are: Administrative data from the fuel administration, CBS environmental protection in the manufacturing industries survey, Input-output tables (2006, next tables will be produced for 2014), CBS specific fuel user surveys, vehicle registration data base and PRTR data (for comparison purposes). The breakdown into economic activities will follow the ISIC4 classification:

- A Agriculture, forestry and fishing
- B Mining and quarrying
- C Manufacturing
- D Electricity, gas, steam and air conditioning supply
- E Water supply and waste management
- F Construction
- H Transportation and storage
- G-U Service activities, including public sector
- Households

The plan is to further expand sectors B,C,D into a two-digit aggregation level, based on CBS surveys data. The rest of the economy level of detail will depend on Input-Output data availability.

The account will cover all fuels types that are used in Israel and will be published considering the limitation of confidentiality. The account will include the greenhouse gases: CO₂ N₂O and CH₄ and other air pollutants: NO_x , SO_x and CO.

Waste Accounts

The waste accounts will cover non-hazardous and hazardous waste streams. Currently the available data sources are: CBS survey data on waste collection and recycling, administrative data from the MoEP regarding land filling and hazardous waste, data based on calculations on the agriculture waste, CBS environmental protection in the manufacturing industries survey and PRTR data (for comparison purposes)

In the first phase the following selected sectors will be covered:

- A Agriculture, forestry and fishing
- B Mining and quarrying
- C Manufacturing
- D Electricity, gas, steam and air conditioning supply
- Households and Commercial sector

In the future the coverage will be expended depending on data availability and resources.

The non- hazardous waste streams will be divided into the following categories, whenever available: mixed waste and dry waste. With regard to the methods of treatment the relevant categories are: land filling and recycling.

4.2 Cooperation with MoEP

The cooperation with MoEP regarding air emissions and GHG is very good. However there is still a need to formalize the cooperation and set regular schedule of professional meetings. In the framework of the preparations for Israel national GHG emission reduction plan, a committee will be established that could discuss data needs and dissemination. This

committee can serve as a good starting point for establishing formal stakeholders MOU. With regard to waste, there is a need to establish a forum that will discuss the methodological issues in order to develop the waste accounts and make better use of the data and indicators produced.

4.3 Cooperation within the CBS.

Towards the development of new input-output tables for 2014, discussions have started in order to incorporate the environmental accounts data needs into the data collection process. For example, the need for a separation of fuels into more detailed level was raised. Cooperation with the academia is also in place.

4.3 Possible consequences for further development of existing data collection

Further surveys could be useful for data collection in order to enhance the coverage of the accounts and the level of detail (by economic activity).

Special emphasis could be placed on the following economic activities:

- Commercial sector (air and waste)
- Construction (waste)
- Hospital (hazardous waste)

4.4 Time plan towards publishing waste and air accounts

The plan is to publish the first air account by 2016 and the first waste account (partial) by 2018.

EPE Accounts

In addition to air and waste accounts, the CBS is expanding the sectors covered currently in the environmental expenditure accounts. It also plans to establish environmental tax database.

5 Impacts

The project contributed to the development of a set of environmental accounts in the ICBS, based on high international standards. Although at this stage the focus is mostly on air and waste accounts, these accounts are a part of a broader plan to develop green economy indicators, led by the MoEP. In addition to the planned air and waste accounts, the ICBS continues to work on expanding the environmental expenditure accounts. The Twinning project especially supported the development of one of these accounts- the environmental tax account. As a result, the ICBS is currently preparing the first estimate of the total amount of environmental taxes in Israel.

The project also improved the coordination process between the ICBS and the MoEP regarding the collection and the publication of the data related to air and waste accounts.

6 Follow-up and sustainability

The plan is to construct the air and waste accounts in the coming 2-4 years, depending on data and resources availability. The accounts will be developed in the most detailed disaggregation level possible. The accounts will follow the SEEA framework.

The air accounts will cover air emissions and greenhouse gases from fuel combustion only. The breakdown into economic activities will follow the ISIC4 classification, and the plan is to further expand sectors B, C, and D of the ISIC4 classification to the two-digit aggregation level, based on CBS surveys data. For the rest of the economy the level of detail will rely on the national accounts input-output data.

The waste accounts will cover non-hazardous and hazardous waste streams. The non-hazardous waste streams will be divided into the following categories, whenever available: mixed waste and dry waste. With regard to the methods of treatment the relevant categories are: land filling and recycling. In the first phase the following selected sectors, cf. ISIC4, will

be covered: A Agriculture, forestry and fishing; B Mining and quarrying; C Manufacturing; D Electricity, gas, steam and air conditioning supply; and the Households and Commercial sector. In future the coverage will be expended depending on data availability and resources. Additional accounts, such as environmental expenditure accounts, including environmental taxes, will continue to be developed, depending on resource availability.

7 Conclusions

The following outcomes have been achieved as a result of the project:

MR7:

- The structure of air and air and waste accounts was set.
- A plan for developing air and waste accounts was established as well as a plan to expand the EPE account.
- Parts of the data have already been collected
- Cooperation with stakeholders was enhanced

Furthermore, a mapping of data sources to be used for the environmental accounts were mapped, see below.

5.1 Mapping of waste accounts data sources

Generation	Mixed	Dry	Hazardous
House hold & commercial	ICBS-M + ICBS-S		ICBS-M
Section A Agriculture, forestry and fishing	MoEP + MOAG + ICBS		iCBS
Section B Mining and quarrying	ICBS-I + MoEP-PRTR		
Section C Manufacturing	ICBS-I + MoEP-PRTR		
Section D Electricity, gas, steam and air conditioning supply	ICBS-I + MoEP-PRTR		
Section F - Construction	MoEP	MoEP	MoEP
Other- Hospitals, Car repair Shop, Transport sector	?	?	?

ICBS-M : Municipal Annual Survey in the ICBS	ICBS-I : Industry Survey in the ICBS	ICBS-S : Social survey in the ICBS
MoEP : Ministry of Environment Protection	Moep-PRTR	MoAG - Ministry of Agriculture

Treatment	Mixed		Dry		Hazardous	
	Recycling	Landfilling	Recycling	Landfilling	Recycling	Landfilling
House hold & commercial	ICBS-M	ICBS-M			ICBS-M	
Section A Agriculture, forestry and fishing	MoAG + MoEP	MoAG + MoEP		
Section B Mining and quarrying	ICBS-I	ICBS-I	ICBS-I	ICBS-I	ICBS-I	ICBS-I
Section C Manufacturing	ICBS-I	ICBS-I	ICBS-I	ICBS-I	ICBS-I	ICBS-I
Section D Electricity, gas, steam and air conditioning supply	ICBS-I	ICBS-I	ICBS-I	ICBS-I	ICBS-I	ICBS-I
Section F - Construction	MoEP	MoEP	MoEP	MoEP	MoEP	MoEP
Other- Hospitals, Car repair Shop, Transport sector						

ICBS-M :
Municipal Annual Survey in the ICBS
MoEP : Ministry of Environment Protiction

ICBS-I :
Industry Survey in the ICBS
Moep-PRTR

ICBS-S :
Social survey in the ICBS
MoAG - Ministry of Agriculture

5.2 Mapping of air accounts data sources

		coal	Naphtha	Natural gas	Residual fuel oil	Gas oil	LPG	Kerosene	Gasoline
House hold						FA, I/O	FA, I/O	FA, I/O	FA, I/O
Section A Agriculture, forestry and fishing					FA, I/O	FA, I/O	FA, I/O	FA, I/O	FA, I/O
Section B Mining and quarrying				AD	SU	SU	SU	SU	SU
Section C Manufacturing			AD	AD	AD/SU	AD	AD	SU	SU
Section D Electricity, gas, steam and air conditioning supply	351-Electric power generation, transmission and distribution	AD		AD	AD	AD			SU
Section H Transportation and storage, postal and courier activities	49- Land transport					AD			FA, I/O
	50-Water transport					FA, I/O			FA, I/O
	51-Air transport							AD	FA, I/O
Other				AD	FA, I/O	FA, I/O	FA, I/O	FA, I/O	FA, I/O

AD - Administrative data	FA – Fuel Administration, MNIWR
SU - Industry Survey in the ICBS	I/O - Input- Output Tables, 2006

MR8 - Twinning activity B.1 (in reality divided between B1 and B2)

Component: Education Statistics

Sub-component: Early school drop-outs

MR8: Detailed plan established for better estimates of early school dropouts.

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List of Abbreviations

BC	Beneficiary Country (Israel)
ICBS	Central Bureau of Statistics (Israel)
MS	Member State

1. Summary description of the Twinning activities

The project included one MS Expert mission to ICBS, split in two parts, the first in November 2013 and the second in April 2014.

During the activities, ICBS described several challenges in the area of statistics on early student dropout in secondary education: finding suitable definitions and indicators to measure student dropout, defining and implementing a measure of hidden dropout. The Danish models used for measuring dropout were presented and discussed, as well as the type of register data that enable Statistics Denmark to implement these models.

In the time between the two missions regarding MR8, ICBS worked on some of the overall issues recommended by the MS Experts after the first mission. These advances have, to some extent, to do with examining the user needs.

In terms of clarifying the terminology ICBS had also made some considerations and clarifications. Several very concrete definitions were presented, and the Ministry of Education pointed out which are the most relevant to them. A process was started at the second mission where different indicators were listed and different aspects of these indicators were discussed.

Between the missions, ICBS made a clear decision on only delivering aggregated figures on hidden drop out to the Ministry of Education. In this area important contact has also been established and new data sources (truancy officer's data) discovered through the interaction with the Ministry.

The involvement of different departments of the Ministry of Education at the second meeting proved very interesting and useful and directed the study of hidden drop out in new directions such as statistics on "disengagement" and the work of truancy officers.

2. Background

ICBS has been publishing statistics on student dropout for many years, so as to provide valuable data to stakeholders, mainly at the Ministry of Education. Despite this, in many cases in the past there have been discrepancies and misunderstandings between the Ministry and ICBS regarding the way of identifying, calculating and measuring school dropout. It has become imperative to arrive at definitions that are understood and agreed upon, as well as elaborating a list of indicators on school dropout that could best serve user needs.

The issue of hidden dropout needs further elaboration, since it has become clear that this issue will gain importance in the near future following new legislation. There is interest in identifying and measuring this phenomenon, taking advantage of ICBS's very detailed data in the area of children and young adults at risk of dropping out of the educational system. Agreed upon definitions are also required here, but also access to additional data sources that could probably be available at the Ministry of Education and other actors.

3. Conclusions and recommendations

The following recommendations were provided during the project:

- Clarify user needs with the Ministry of Education
- Investigate the policy ambitions in the area of drop out in Israel
- Clarify terminology, internally and externally regarding drop out and educational level
- Clarify which data sources are lacking to fulfill the theoretically ideal definition and measure of drop out

- Describe what need to be established to solve the issue of lacking data sources or lacking data quality
- Select relevant indicators to describe the drop out versus the completing students
- Apply data from the LFS in the area of educational statistics to take advantage that they are in fact collected and could be used for international comparisons
- Discuss which indicators are needed and how they should be broken down
 - Consider the educational levels required to avoid being counted as drop out
- Debate with the top management of ICBS, the Ministry of Education and representatives from the educational institutions if data should be published at an institutional level. It may be controversial but at the same time very useful information for all stakeholders and the Israeli public as such.

Recommendations on *hidden drop out*:

- If a predictive model is to be developed by ICBS, the MS Experts recommend that it only be used on a statistical level
 - The model could be inspired by the Danish so called “Profile Model”
- In more general terms, from MS point of view, it would be recommended to focus more/exclusively on descriptive statistics in this area
 - Take full advantage of the rich data available in this field in Israel
 - This should be sufficient input for the policy making process.
- Consider expanding the work on hidden drop out to include
 - Disengagement
 - The work of truancy officers
- Investigate, describe and include all available data sources
- Invite the stakeholders to express their views on this subject again in order to achieve a full list of relevant indicators
- Discuss with important stakeholders, which are the more relevant indicators
 - Is it more interesting to have descriptive statistics on disengagement than predictive models on hidden drop out?

Overall issues

- Explore the possibilities of establishing a longitudinal integrated register
 - Centered around a few basic variables: (Person ID, Institution ID, Education ID, StartDate, EndDate, EndStatus)
 - Integrated over time and across educational levels
 - Making it possible to look at the entire educational system in one uniform way across all educational levels
 - Making it possible to analyze on different definitions of drop out, flexible adaptation to new standards
 - Enabling cohort studies for long periods of time across various educational levels
 - Applying the same definitions for drop out for all educational levels / and other statistics.

4. Implementation of the mandatory results

4.1 Co-operation with the Ministry of Education

Already during the two missions regarding B1, ICBS began examining user needs, summoning representatives from the Ministry of Education and starting a dialogue on what to prioritize when developing new indicators on dropout statistics. ICBS has continued maintaining this including approach, even to expanding it to include other relevant institutions and organizations, such as the National Authority for Evaluation and Assessment in Education (RAMA).

In terms of clarifying the terminology ICBS presented concrete definitions, and the Ministry of Education pointed out which are the most relevant to them as a user of statistics. A process was started at the second mission where different indicators were listed and different aspects of these indicators were discussed.

In order to continue this co-operation process that was started during the Twinning activities, it has been decided to establish a working group: MoE-RAMA-CBS aimed at completing a list of drop-out indicators.

A fruitful meeting was held on Oct 29th, 2014 at the Ministry of Education with the Truancy officer's Department and its new director, stating a process of co-operation that will be followed by more concrete joint action in upcoming meetings and document exchanges.

4.2 Developed indicators – preliminary data

Owing to limited resources, the first need was to prioritize among the many possible indicators that could be developed. After two rounds of consultations with the Ministry of Education, the list of drop-out indicators to establish a complete picture of possible indicators and their definitions has been narrowed from an initial list of 12 to five final indicators to be developed:

1. Annual dropout
2. Cohort dropout rates
3. Educational attainment of 25-year olds
4. Dropout prediction model
5. Measure of disengagement ("hidden dropout")

Each of these indicators is currently at a different stage of development.

4.3 Presentation of detailed plan towards publishing the results

A development plan for the proposed indicators is being finished these days (in Hebrew), detailing for each indicator its description, the required actions to be undertaken, expected challenges, timetables and periodicity of update, as well as necessary resources. It is expected to be delivered to ICBS's top management by early December. Provided that the expected resources are made available, the general plan can be summarized as follows, for each expected indicator:

1. **Annual dropout** is based on statistics being already currently published by ICBS. The development work required is to include the participants at the Hilla project in the calculations, so as to consider them as enrolled students. Provided that the Ministry of Education sends to ICBS updated Hilla files by January 2015, the newly calculated indicator is expected to be published on the Statistical Abstract as a revised table on **September 2015**.
2. **Cohort dropout rates** are based on statistics being already reported to OECD by ICBS. Provided that the Hilla file is supplied on time, the indicator (tables for OECD) is expected to be ready by **June 2016**.
3. **Educational attainment of 25-year olds** can be calculated using three different possible methodologies. Initially it is possible to publish the indicator age span of 25-34 year-olds, which is available for OECD reporting. Such an indicator can be provided to the Ministry of Education as early as **February 2015**. If afterwards there is further demand for an indicator on the specific age of 25, data based on the Labour Force Survey should be made available for this purpose, and we estimate that this can be done by **May 2015** (in such a case, data production is under the responsibility of the Labour Statistics Sector). If there is future demand for a different methodology (the cohort method), resources should be made available and it could probably be done during **2016**.
4. **Dropout prediction model** – It requires, in addition to a rich list of data sources available to ICBS, at least three additional data sources, two of them from the

Ministry of Education (MANBAS and some fields from the Truant Officer's files) and one from RAMA (School climate). Since it depends of external factors, the eventual timetables may vary. Upon receiving the necessary data files, our estimation is that it would require about **18 months** to calculate and publish the results of the proposed indicator.

5. **Measure of disengagement** ("hidden dropout") – This indicator relies partly on the previous one, as the variables found in the **prediction model** to best predict eventual dropout are planned to be described in further detail, including the correlations between them. Final profiles of disengaged students by different characteristics are expected to be made available about **18 months** after indicator 4 is published.

MR9 - Twinning activity B.2 (in reality divided between B1 and B2)

Component: Education Statistics

Sub-component: Higher Education Statistics

MR9: Definition of new indicators of higher education statistics

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List of Abbreviations

BC	Beneficiary Country (Israel)
HE	Higher Education
CHE	Council of Higher Educations
CBS	Central Bureau of Statistics (Israel)
DS	Statistics Denmark

PART 1. Higher Education Indicators (other than drop-out)

1 Background

As a part of the TWINNING project, the Higher Education objective was to improve existing indicators and build new ones. Four topics were defined (new entrants, grade statistics, part-time students, pre- academic achievements). As a result of the project- two topics are already published and used, and the other two will be published. The impact of the project is on several levels: In the international level- our definitions are consistent with the OECD definitions and our data can be compared to other countries' data. In the national level- policy makers (e.g. CHE) are using the new indicators for several uses and the change is important.

Starting Point

The ICBS higher education statistical system is very functional and detailed, with:

- a. ideas on how to further develop statistical program, indicators and organization of data,
- b. an ongoing project to develop a data warehouse – ISOPED,
- c. data sources and data production of good quality, that makes it relevant to investigate the possibilities of establishing an integrated longitudinal register for the entire Israeli educational system.

Topic 1: Higher Education department has published data on new entrants for several uses. A new entrant was defined by defining the first as the starting year of each student in a specific institution (taken from the institution's file). This method had its limits since a student could have moved to another institution and still be considered as a new student (although he is not new in the HE system).

Topic 3: Grade statistics is published only by institution's type (University vs. college. There is a need to work on the coverage and quality of the data that is coming from each institution.

Topic 4: A part time student is defined as a student that doesn't study a full program, and can take even one or two courses each year (mainly in the Open University in Israel). There is a question whether to consider these students as regular students or not.

Topic 5: HE statistics can be expanded and be more relevant by merging it and relating it to prior academic- education achievements. There is a demand and a will to publish this interesting data and the methodology and presentation must be studied.

Objectives

The overall objective of the Twinning project was to improve the quality and international comparability of Israel official statistics in key domains.

This overall objective was backed by three general purposes of the Twinning project:

- Aligning National Accounts, Education Statistics and Survey Methodology to the EU and other international organizations' standards and guidelines
- Coordinate the National Statistical System (NSS) and prepare strategic plan for official statistics, including dissemination and communication strategy
- To redesign the ICBS website to meet users' needs

2 Conclusions and Recommendations

The main recommendations of the Twinning experts were to work on improvements in areas of:

- a. examining user needs
- b. describing policy targets in the area of education
- c. clarifying applied terminology
- d. describe data sources (existing and especially missing)
- e. consider the limits and possibilities of the cooperation with the ministries
- f. developing an overall strategy for the area of education statistics within ICBS
- g. consider utilizing and promoting digital solutions in order to optimize data collection in terms of speed, quality and content.

Here are the main recommendations listed by topics:

Topic 1: New entrants

- Developing the current indicator based on international definitions and the CHE needs.
- A document on the applied terminology should be published
- Data on both the "old" definition (the starting year of each student in a specific institution) and the new definition (new in the HE system) should be published in order to monitor the two different tendencies

Topic 3: Grade statistics

- Coverage and quality in data collection should be expanded – would it change the statistics?
- To consider transparency vs. complexity
- Consider including the ministry and universities in the process of deciding on indicators – statistics divided on different institutions is an interesting indicator, seek approval.

Topic 4: Part time students

- To consider defining open university as a specific educational type – never full time study (by definition) all other university studies could be full time studies (by definition)
- To consider applying the international standards for the definition of full time vs. part time studies (75 pct. Credits/ECTS points per year)
- To consider on the long term basis to have the universities deliver information on part time/full time distinction for their enrolled students.

Topic 5: Prior education achievements

- To consider the target group when deciding on relevant levels of presentation, methodology and so on.
- To consider the overall role of ICBS when publishing in this area – statistics for the public, institutions or the ministry?
- General recommendations:
 - To establish ongoing formal relations with key users and providers of educational data – ministries, labor market parties, educational institutions, IT suppliers etc.
 - To develop an overall strategy for the area of education statistics in ICBS - a strategy developed in close cooperation with the primary stakeholders
 - To clarify the priorities – data collection, quality, speed, user inclusion, presentation forms/levels/complexity/transparency
 - To develop overall objectives for the statistical outcome and general guidelines to orient towards when designing new indicators and new methodology

3 Implementation of the Mandatory Results

3.1 Co-operation with the Council of Higher Education

The co-operation with CHE has been improved and is very good in the past year. We have worked on it by increasing the amount of meetings and presentations regarding some topics, and have been sharing the CHE in decisions and changed that have been made in the department.

3.2 Developed indicators – preliminary data

Topic 1: New entrants: A discussion was held and the new data was already published.

The data was published on both definitions- the old definition (the starting year of each student in a specific institution) and the new definition (new in the HE system) in 'statistical abstract of Israel 2014' (8.54 8.55 8.57 8.59 8.60).

The new applied terminology was defined and documented in 'statistical abstract of Israel 2014' (p365, 76).

Topic 3: Grade statistics: We continue to publish average score and standard deviation by subjects of study. There is need for further action and thinking in the future.

Topic 4: Part time students: In a meeting that was held in Open University it was decided that there is need to publish information about part time and full time students in Open University, and the data will be produced in the near future.

Furthermore, there is need to examine the quality of information that academic institutions can supply about part time/full time students.

Topic 5: Prior education achievements: Several tables containing large amount of information were published (see Annex).

3.3 Presentation of detailed plan towards publishing the results

Four statistical indicators on higher education were developed within the project period.

The first indicator of statistics on new entrants was already published by ICBS in September 2014 and is already used by CHE for budget and planning uses.

The indicators of grade statistics and prior education achievements are planned to be published by the end of 2015.

The indicators of part time students is planned to be published during the year 2016 because of its complexity.

4 Impact

The overall objective of the Twinning project was to improve the quality and international comparability of Israeli official statistics in key domains.

- The project improved the capacity of the ICBS to comply with EU and international statistical standards. The new definition of new entrants that emerged as a result from the project matches the OECD definition: "New students- New entrants into a level of education are enrollees who have never been included in the corresponding count of students for that level of education previously. Individuals who are returning to study at a level following a period of absence from studying at that same level are not considered to be new student (new entrants)."
- As a result of the project- the HE indicators were improved, and therefore the data is more accurate.
- New and important data is published now (pre- academic achievements), and is used by stakeholders and policy makers.

5 Follow-up and Sustainability

The results of the project are generally quite tangible, and will therefore result in new statistical indicators being published or improved planning procedures and business processes.

Mandatory Result		How will the output be utilized by ICBS?	How will ICBS continue the work?
9	Higher education	<ol style="list-style-type: none"> 1. Newly developed statistics on new entrants already published, Sept. 2014. 2. The methodologies related to new grade statistics and statistics on prior education achievements were developed, and new series were published. 	The co-operation with the Council for Higher Education continues. Methodology on new statistics on part time will continue, and these statistics may be published in 2016.

6 Conclusions

The impact of the Twinning project is great and visible, and a lot of results is observed. We developed new series of data (the pre- academic achievements of students) and improved existed data to be more accurate and true (new entrants). We also continue to improve other topics (grades and part- time students) and believe that the results will be seen very soon.

The impact of the Twinning project is visible not only through the achievement of the large number of results, but also at the organizational level regarding both the business processes and co-operation with external partners. In particular, the development of a strategy for ICBS has outlined what will be the direction of the development of the organization and its policies during the coming five year period.

PART 2 – Higher Education Drop-out Statistics

1 Summary of the project.

Two projects were undertaken within the Twinning framework in the ICBS, Higher Education Follow-up and Course of Learning Branch, including:

1. B2 (dropout indicator sub-component) – Higher Education non-completion statistics (under the general realm of HE indicators).
2. B4 – Estimation of personnel engaged in R&D related work within the HE sector.

Both can be classified as *project development* work comprising of theoretical and practical tasks aimed at establishing serial statistical outputs in the future that are either mandated by the OECD (for B4), or are deemed valuable for our organizational beneficiaries (B2). Towards this aim, the projects were aided through recurring consultations with our Danish partners which included three mission visits (two for B2 and one for B4).

Mission visits enabled subject matter to be effectively exchanged, both through formal presentations and informal discussions (4 presentations were delivered from our end and 2 from SD). Additional homework, after the mission visits, was undertaken by SD in the form of dissemination of (additional) relevant material (and some review of our work). From our side, analysis papers were written for both Twinning projects. In addition, an in-depth pilot project was conducted aimed at learning and testing in the field estimation methodologies, necessary for bringing the end product of B4 to full fruition. Finally, we conclude the project by submitting culminating summary documents, detailing the planning necessary to realize these two project aspirations. More specifically, we submit the following documents:

1. “Indicators and Measurement of Discontinuation from Higher Education” – Twinning B2 Summary Document.
2. “Higher Education Research & Development Personnel Estimation” – Twinning B4 Summary Document.

These two documents detail the project final product (see methodology section, in this chapter, below, and in the chapter on MR11).

2 Background

Education Statistics department have published statistical figures on HE non-completion in several different guises over the years. Firstly, two publications using a cohort follow-up approach at the individual record-level were published in the 1990s. This product presented enrolment leading to completion by year since commencement. Secondly, the ICBS published a table on degree *completion* within 5 years in the Annual Statistical Abstract. Thirdly, a new statistical series using a different methodology and endorsed by the OECD is published focusing on completion in relation to “standard degree time”. In contrast to these products, no publications have been produced on the complementary statistical category of “dropout” (or non-completion), despite the great need for such data by HE administrators. Therefore, within the Twinning B2 project framework we explore and propose new indicators specifically pertaining to non-completion.

B4 - In order to meet OECD statistical outputs, the ICBS disseminates annual figures on personnel and FTEs actively engaging in R&D work in accordance to the OECD Frascati Manual (FM) guidelines. However, these figures are generated and published by several ICBS departments, each covering a different national employment sector. Unfortunately, the statistics relating to R&D personnel in the higher education sector show partial coverage and require revision to improve both their quality and breadth. More specifically, we believe that improvements are required to improve coverage of other junior R&D researchers such as advanced research students as well as non-researcher R&D auxiliary manpower, as mandated

by the FM. In addition, current statistics do not disseminate R&D personnel figures in full-time equivalencies (i.e., job positions or FTEs), also mandated by the OECD FM. In order better to fulfill our expectations we utilize the Twinning B4 project development framework and re-engage this topic afresh, reviewing the current ICBS and international experience, propose an estimation methodology and attempt a real-world estimation pilot that most feasibly exploits our existing data sources toward our aims.

The purpose of the B2 and B4 missions was to assess the current situation, to identify problems and indicate possible solutions to solve them. During both sessions an overview of the current situation was first presented, followed by discussions and consultations that culminated with presentations of general recommendations by our Danish partners. More specifically, four presentations were presented from our department: 1) a general overview of our department statistical production; 2) a theoretical presentation on the problematic nature of defining, analyzing and presenting HE dropout statistics (for B2); 3) a presentation highlight potential solutions to our problem of non-completion statistics; 4) a detailed presentation of data sources and methods potentially useful for estimating personnel engaged in R&D activities within the HE sector (for B4).

3 Conclusions and Recommendations

The following recommendations related to MR9 (dropout section) have been provided during the project:

- a) Consider the use of another word instead of “drop-out” e.g. “Discontinuation of Higher Educations”.
- b) Cooperate internally in ICBS across educational levels on the definition of drop-out.
- c) Clarify user needs with the Council of Higher Education.
- d) Develop relevant indicators to describe the drop-out versus the completing students:
 - a. Quick status for policy makers (annual status like the Finnish model).
 - b. Long term stabile cohort-based discontinuation statistics (similar to triangular-model presented by ICBS from older publications on course/duration of HE studies).
 - c. Non-completion in reference to Standard Degree Duration.
- e) Other general recommendations include the following:
 - a. Establish ongoing formal relations with key users and providers of educational data – ministries, labor market parties, educational institutions, IT suppliers etc.
 - b. Be aware of the upcoming challenge of providing statistics on students enrolled in Massive Open Online Courses.
 - c. Develop an overall strategy for the area of education statistics in ICBS - a strategy developed in close cooperation with the primary stakeholders.
 - d. Clarify the priorities – data collection, quality, speed, user inclusion, presentation forms/levels/complexity/transparency.
 - e. Establish closer relationships between departments of education statistics within ICBS.
 - f. Develop overall objectives for the statistical outcome and general guidelines to orient towards when designing new indicators and new methodology.
 - g. Develop strategy to reduce response burden, improvement of data quality and coverage by optimizing data collection, developing new IT tools/system-to-system solutions for transmission of data, improve data organization (ISOPED).

4 Implementation of the mandatory results – sources and methods

4.1 Adoption of discontinuation of HE terminology. In keeping with the recommendation by our Danish partners and the discovery that the term “dropout” is nearly universally reserved

for the secondary-school education level setting, we adopted the term of “non-completion” for our statistical products.

4.1.1 Cooperation internally in ICBS on definition of drop-out. It was accepted that greater cooperation could be provide benefits to all parties involved. Consequently, there is a monthly forum for mutual discussions (seminar) which we intend exploit towards this end. Presentations on the planning and development for this project are being planned. Having said that, and despite the topical similarity, there are significant differences in methods and requirements between “dropout” statistics measured for K-12 (also treated in Twinning B1) and non-completion within HE (in Twinning B2).

4.1.2 Clarify user needs with Council of Higher Education. This recommendation was accepted but only partially implemented. Detailed meetings with the CHE are on-going on a variety of topics. Non-completion statistics was brought up under this guise and CHE sees further development of this topic in a highly positive light. The CHE currently receives from the ICBS informal estimates on non-enrollment after in the initial first year. Development of a formal statistical series together with a comprehensive statistical analysis would be highly desirable.

4.1.3 Develop relevant indicators to describe non-completion (including 3 different varieties described in 3.1.1d). The recommendation to implement all three models in our planning was accepted in full. A detailed analysis document covering the planning and implementation of all three models was composed and submitted to our Danish partners. The document critically reviews the positive and negative aspects of each indicator typology and was submitted to a variety of independent consultants for final review. The “Discussion” section of the submitted summary document details where the project stands today and what we envision for the future.

4.1.4 General recommendations (listed in previous Twinning documents). We accept the recommendations where applicable. A written response was submitted to our Danish partners and Twinning administrators detailing which recommendations we find acceptable and implementable.

5 Impact

The development of 3 different indicators of discontinuation that in unison cover the multiple dimensions of this data is expected to impact largely on how policy workers can work on reducing the dropout phenomenon. On-going discussions with the Isreal Council for Higher Education, the governing body of higher education in the country, on this topic have been very positive. In particular, their representatives have shown great interest for these data as they can strongly impact the efficacy of stratgies targeted to specific “high-risk” groups. This is especially the case in this project, as current data are partial and in the case of the “matrix” indicator option is produced at very lengthy time-intervals (once in a decade or so).

6 Follow-up and Sustainability

The result of this project is expected to lead to a full but gradual implementation of these dropout indicators in the future, starting with 1 year discontinuation measure, followed by the development of the two remaining indicators (dependent on necessary budgetary funding).

Conclusions

The following outcomes have been achieved as a result of the project:

- a. Draft document completed of final planning document promoting the collection, analysis and dissemination of 3 different indicators of HE non-completion. Submitted for review.

- b. Information on estimation methodology from Statistics Canada obtained, assimilated and applied in a real world setting.

8 Methodology regarding Higher Education Drop-out Statistics

Introduction

This documentation presents the final recommendations on the development of statistical indicators measuring “drop-out” from higher education in Israel and is the culminating product from Twining B2 – Topic 2 project: “Higher Education Dropout Statistics”. As such it aims to meet the project mandatory results, MR 8 – “Detailed plan established for better estimates of early school dropouts.”

Within this document is a concise² review of our decision to develop three different indicators relating to higher education dropouts, in consultation with partners in the Eurostat Twinning program from Statistics Denmark³. We present each different indicator and discuss its relative merits and deficiencies. In all, it was decided to adopt *three* distinct indicators, each representing a different side of the dropout phenomena, but which together form a complete picture for the policy analysts on the topic. These indicators are as follows:

1. Discontinuation following a full year after 1st enrollment in higher education
2. Non-completion of study program in relation to the "standard degree time"
3. Course of studies trajectory matrix - "matrix of discontinuation"

Finally, it was also decided that the terminology associated with the dropout phenomenon be distinct from that generally used in secondary-school settings, including the designation of premature disruption of studies in higher education, even temporarily, as “discontinuation”. This term is also used in at least one international statistical agency that we are aware of, in Statistics Finland. More on this decision can be found in the final, “Discussion” section of this document.

This documentation explicitly explains about different methodologies related to higher education drop-out. Besides, other indicators relevant to higher education statistics were developed, cf. the conclusions in section 5, below.

1. Indicator 1: Discontinuation one year after 1st enrollment

The first indicator that covers the early interruption of higher education studies is a calculated rate/percentage measure which aggregates the total number of persons from a specific higher educational (HE) cohort that were not enrolled one full calendar year after their initial enrollment event. The indicator is in use in Statistics Finland where they publish a statistical series on discontinuation and its association with a host of co-varying analysis variables.

The methodology defining this measure is as follows:

1. Annual data files from each higher education institution are grouped together and subsequently linked at the individual person ID level, using a unique identifier number. Persons who are listed in beginning of year X who are not listed in an education file the following year (September X+1) and did not graduate/complete/qualify their study course are considered as "discontinued".
2. The following cases are discarded from the study population:
 - a. Persons with incomplete/erroneous ID numbers. Fictitious ID numbers, distributed among foreign student, are not counted since such numbers are not recognized at the full HE system level.

² More information detailed information can be found in other Twining B2 documents.

³ We graciously thank Mr. Peter Peter Bohnstedt Anan Hansen and Mr. Christian Vittrup from Statistics Denmark for their assistance and accompany throughout the length of this project.

- b. Persons who already attained a degree qualification of the same level prior to the cohort year (beginning of year X).
 - c. Persons who enrolled in learning institutions that did not open their doors the following year (X+1).
 - d. Persons in "adult education" – over 40 years of age. These persons traditionally follow different educational trajectories, often times enrolled in short-cycle courses of one year or less, or among retirees learning programs aimed primarily for personal enrichment.
 - e. Persons enrolled in specific educational institutions outside the standard HE framework (e.g., Open University⁴, academic preparatory, apprenticeships, special needs students, etc.).
3. Each cohort is defined within a single HE educational institution enabling the follow-up across different trajectories including:
 - a. Higher education (academic) system – case not found in any recognized HE institution including: university, academic colleges and academic teacher training colleges.
 - b. Academic institution – case not found enrolled within the same institution in the following year, *and* was found enrolled in a *different* academic institution (i.e., transfer students).
 - c. Field of science follow-up Type I - cases not found in the same field of science at the same institution in the following year, but were enrolled in the *same* institution in the following year.
 - d. Field of science follow-up Type II - cases not found in the same field of science at the same institution in the following year, but were enrolled in the *different* institution in the following year.
 4. Analysis variables include the all recommended OECD variables, after undergoing necessary quality control checks.

Advantages of this indicator include:

1. Timeliness – given that the follow-up period is limited to one year alone, it is possible to publish statistics that are current and relevant to interested parties.
2. Significance – studies abroad and in Israel have shown the first year after initial enrollment contains the highest marginal discontinuation rate. Educational administrators seeking to make the greatest impact on the reduction of discontinuation can focus efforts to achieve highest efficiency using this simple indicator as a benchmark.
3. Simplicity – the calculation of discontinuation after one year from initial enrollment is intuitive and easy to execute.
4. International comparability – the indicator is used and published in at least two other countries known to us (Finland and The Netherlands). It is likely that there are other users as well (unknown to us in non-English speaking countries).

Disadvantages of this indicator include:

1. Incompleteness – because the follow-up period is limited to one year it does not cover the total level of discontinuation, which often spans over a period of five years or more (for a Bachelor's degree). Reliance on this single indicator alone may therefore lead to biased conclusions.

⁴ The Open University is excluded from all three discontinuation indicators because it is a unique institution with a policy of unlimited unselective admission and retention. Consequently, it is inappropriate to compare this institution to others who operate in the traditional sense. Moreover, a not insignificant percentage of students in other academic frameworks enroll in the Open University as their initial academic institution which would eliminate these cases from the "traditional" follow-up analysis. Nevertheless, it is recognized that publishing discontinuation indicator for this framework *in isolation* would be highly desirable and feasible.

2. Inaccuracy – by placing so much weight on timeliness (in a one-year follow-up), any inaccuracies that may occur either on the part of the reporting institutions or the analyzing statistical agency, will because have disproportionate significance.
3. Inflexibility – specialized learning trajectories of particular sub-populations including those taking a temporary leave of absence after one year will be miss-specified (e.g., special educations programs, mothers on maternity leave, career soldiers-students on learning leaves, etc.).

In order to inform readers, a few working examples are presented below, taken from Statistics Finland website.

Appendix table 1. Discontinuation of education in upper secondary general, vocational, polytechnic and university education in academic years 2000/2001–2011/2012, %

Academic year	Sector of education			
	Upper secondary general education (aimed at young people)	Vocational education (aimed at young people)	Polytechnic education (Bachelor's degrees)	University education (Bachelor's and Master's degrees)
2000/2001	4,2	13,1	9,5	4,2
2001/2002	4,1	12,3	7,6	5,3
2002/2003	3,7	11,3	8,2	5,0
2003/2004	3,8	10,7	8,4	4,8
2004/2005	3,9	10,5	8,7	5,4

Discontinuation of education leading to a qualification or degree by sex and sector of education in academic year 2011/2012 1)

Sex / sector of education		Number of students used in the statistics on discontinuation of education 20.9.2011	Discontinued in own sector of education	Changed sector of education	Discontinued completely education leading to a qualification or degree
			%	%	%
Total		502 762	7,0	1,4	5,5
Men and women	Upper secondary general education (aimed at young people)	98 687	3,5	1,9	1,5
	Vocational education (aimed at young people)	129 805	8,7	0,9	7,8
	Polytechnic education (Bachelor's degrees)	130 683	8,5	2,0	6,4
	University education (Bachelor's and Master's degrees)	143 587	6,4	0,9	5,4
Men	Total	238 676	7,6	1,3	6,3
	Upper secondary general education (aimed at young people)	42 622	3,7	2,0	1,7
	Vocational education (aimed at young people)	68 436	8,3	0,6	7,7
	Polytechnic education (Bachelor's degrees)	61 050	10,2	2,1	8,0
	University education (Bachelor's and Master's degrees)	66 568	7,2	1,0	6,2

2. Indicator 2: Non-completion of study program in relation to the "standard degree time"

The second indicator which we recommend is a measure of non-completion in relation to a "standard degree time". This measurement presupposed that academic degrees have a finite time limit which is mandated by the governing authorities of academic institutions in Israel, the council for higher education (CHE). As such this indicator requires that:

1. Students are enrolled in full-time study programs. A minimum coursework load is taken by each student, at the semester level, as dictated by the particular academic institution.
2. Students are learning in programs with a terminal point, culminating in a graduation degree completion. Therefore, programs geared to personal enrichment, occupational training (גמול השתלמות in Israel), etc. are not included in these counts.
3. Each program/field of scientific study has a definitive number of semesters required to attain a completion degree qualification. Commonly, these standards are defined in Israel as 3 academic years (i.e., 6 semesters) for the completion of a Bachelor's Degree, but exceptions exist in particular fields that lengthen degree time period up to 2 years more.
4. The indicator forms the complement to an already published data series, "completion of study program in relation to standard degree time"⁵.

The methodology defining this measure is as follows:

1. Annual data files from each higher education institution are grouped together and subsequently linked at the individual person ID level, using a unique identifier number.
2. Cohorts are defined by listing persons in year y , which represents the first appearance of person p , in the academic education student enrollment and degree attainment files.
3. Persons are assigned a standard degree time, based on the time allotted to the 1st field of science⁶ recorded within particular academic institution⁷ enrolled.
4. Event statuses of academic studies are recorded for each individual at the following time slots: standard degree year (SDY), SDY-1, SDY-2, SDY-3, SDY+1, SDY+2, SDY+3; Non-completion at each slot, carries a value "1" (i.e., completion gives a "0" value).
5. Aggregation of all cases by academic year cohort in accordance to co-varying analysis variables mandated by OECD. "Rates of Non-completion" calculated, tabulated and published.
6. The following cases are discarded from the study population:
 - a. Persons with incomplete/erroneous ID numbers. Fictitious ID numbers, distributed among foreign student, are not counted since such numbers are not recognized at the full HE system level.
 - b. Persons who already attained a degree qualification of the same level prior to the cohort year (year y).
 - c. Persons who enrolled in learning institutions that did not open their doors the following year ($X+1$).
 - d. Persons in "adult education" – over 40 years of age. These persons traditionally follow different educational trajectories, often times enrolled in short-cycle courses of one year or less, or among retirees learning programs aimed primarily for personal enrichment.

⁵ See (2012) *Characteristics of Studies and Integration into the Labor Market Among 1st Degree Recipients from Institutions of Higher Education in Israel, 1999-2008*. ICBS Publication #1471.

⁶ Persons may enroll for up to two different field of science (majors) in Israeli academic institutions. In analysis conducted at the field of study level (as opposed to headcount level), it is possible to incorporate the second field of study (per person) as a separate, additional count.

⁷ A few fields of sciences carry different standard degree times by institution.

- e. Persons enrolled in specific educational institutions outside the standard HE framework (e.g., Open University, academic preparatory, apprenticeships, special needs students, etc.).

Advantages of this indicator include:

1. Substantive significant – provides an indicator *within its institutional context* (of field of science in particular academic institution). Consequently, interpretation is clarified since any deviation from standard times is considered as economically and/or socially undesirable (according to education system administrator goals). As the indicator measures non-completion of learning *degree* it provides policy analysts with a long-term effect of cumulative lost investments (over multiple years) at the system and individual level. This is in fact the case because only learning accompanied with degree completion represents a full return on investments (according to labor economic theory and standard labor practices).
2. Simplicity – indicator mitigates effects of temporary leaves of absence (e.g., maternity leave) since follow-up coverage spans a lengthy period including up to three years *after* and three years *before* SDY.
3. International comparability – the indicator is largely measured indirectly in OECD publications via, the complement to measures of “completion in relation to standard degree time”. Nevertheless, no publication was found to include SDY minus year *y*.

Disadvantages of this indicator include:

1. Inaccuracy – the indicator is difficult to execute for persons who *transfer* fields of science and/or academic institutions that assign different standard degree time to particular fields of science. In such cases, persons are considered as non-completers when in fact they are continuing their academic education in a different setting. Similarly, because data collection of student enrollment records may not be accurate in listing multiple fields of science in their correct hierarchy (1st, 2nd, etc.), an unspecified number of miss-matches may occur in the follow-up. This situation is correctable (e.g., through advanced programming and in-depth quality control checks), but doing so may lead to data series incompatibilities (i.e., completion statistics are currently based on institutional choices in field of study hierarchy).
2. Timeliness – statistics on non-completion require a time-lag comprising a minimum of years toward SDY. Hence, short-term trends in discontinuation of academic education are non-existent except in a few short-cycle certification studies.
3. Inflexibility – specialized learning trajectories of particular sub-populations including those taking a temporary leave of absence after one year will be miss-specified (e.g., special educations programs, mothers on maternity leave, career soldiers-students on learning leaves, etc.).
4. Simplicity – the calculation of non-completion requires up to date knowledge of academic institution system in order to mark changes in SDY for particular fields of science per institution.

In order to inform readers, a few working examples are presented below, taken from an ICBS publication which measures completion. *Readers should substitute the work completion for non-completion.*

	מכללות אקדמיות לחינוך Colleges of Education	מכללות אקדמיות Academic Colleges	אוניברסיטאות Universities
Total			סך הכל
Within standard duration	34.1	52.4	50.0
One year after standard duration	45.4	67.0	70.3
Two years after standard duration	50.6	71.3	77.6
Three years after standard duration	54.0	73.4	80.4
Education and teacher training			חינוך והכשרה להוראה
Within standard duration	34.1	46.5	46.1
One year after standard duration	45.4	58.8	65.5
Two years after standard duration	50.6	60.8	74.2
Three years after standard duration	54.0	61.5	77.7
Humanities (except design)			מדעי הרוח (למעט עיצוב)
Within standard duration	-	14.1	32.9
One year after standard duration	-	39.2	55.0
Two years after standard duration	-	47.4	64.5
Three years after standard duration	-	52.6	68.6
Social sciences			מדעי החברה
Within standard duration	-	56.9	54.8
One year after standard duration	-	70.5	74.8
Two years after standard duration	-	75.0	81.5
Three years after standard duration	-	77.2	83.9

3. Indicator 3: Course of Studies Trajectory Matrices

The third and last indicator measuring discontinuation of studies in HE is the “course of studies trajectory matrix table”⁸. As such, the indicator is in fact a table (or series of tables) that describe the annual flow of student enrollments over time through the HE system, beginning with the first year of entry, defining each cohort. Within this paradigm “time” is indicated by the event of enrollment or non-enrollment at each consecutive year following the initial germinal cohort year; and tracking period, while generally limited by physical (paper) space constraints, are in practice censored at arbitrary points characterized by the convergence of diminishing annual marginal increments to the total enrollment/non-enrollment rate.

Visually, the indicator is portrayed as a “triangular matrix” table where rows and columns indicate cohort year and event tracking year (or vice-versa i.e., but order is not important). Cohort years are presented in sequence from the most historic but relevant data year available to the most recent year of data collections, enabling the analyst to accurately compare rates of discontinuation between cohorts at the same follow-up period (e.g., cohort year+1,+2, +3, etc.). Hence, while this aggregated matrix tabulation methodology does not enable for the decomposition of time-related effects (period, cohort and age effects) without noteworthy multivariate modelling⁹, they do provide the analyst an estimation of their total effect.

⁸ The ICBS published two detailed publications generally following this methodological paradigm including: (1993) *Course of Studies of University 1st Degree Students*. Special Series No. 929; and (1997) *Admission and Course of Studies of Students at Universities*. ICBS Publication #1056.

⁹ Decomposing time-related effects (period, cohort, age, censoring) is a complex matter notoriously difficult to disentangle, often requiring close (case-study) knowledge on the side of the analyst.

In order to provide a full accounting of event paths for each cohort, separate matrix tables can also be presented for particular sub-populations including paths for continued enrollment, non-enrolled students, and successful termination (i.e., degree attainment). Likewise, additional analysis levels can and should be incorporated within this paradigm including continuation/non-continuation by: educational system, higher education institution type (e.g., universities, academic college, teacher training college, etc.), academic institution, faculty/field of science and academic degree level (e.g., Master's Degree among Bachelor's Degree recipients) (among others) and combinations of institutions and field of science (both).

It is noteworthy to point out that *within this indicator paradigm no set definition of "drop-out" or "discontinuer" is adopted*, but instead the analyst is given the freedom to draw their own conclusion as to what represents permanent termination of studies (at the aggregate level). This is because conceptually, course of study matrices are intrinsically imbued with the idea of indefinite follow-up, contrasting the two previous indicators covered.

The methodology defining this measure is as follows:

1. Annual data files from each higher education institution are grouped together and subsequently linked at the individual person ID level, using a unique identifier number.
2. Cohorts are defined by listing persons in year y , which represents the first appearance of person p , in the academic education i within the student enrollment and degree attainment files. In order to mitigate confusion only first enrollment in academic education is counted toward cohort assignment.
3. Follow-up year are defined sequentially in relation to the cohort year – cohort year+1, year+2, cohort year+3...cohort year + n , where n is the year showing insignificant level of change from year- n (to be defined after post-hoc after seeing empirical results).
4. Event statuses of: enrollment, non-enrollment, degree attainment are recorded for each follow-up year for each student case.
5. Aggregation of all cases by academic year cohort in accordance to co-varying analysis variables mandated by the OECD.
6. The following cases are discarded from the study population:
 - a. Persons with incomplete/erroneous ID numbers. Fictitious ID numbers, distributed among foreign student, are not counted since such numbers are not recognized at the full HE system level.
 - b. Persons who already attained a degree qualification of the same level prior to the cohort year (year y).
 - c. Persons who enrolled in learning institutions that did not open their doors the following year ($X+1$).
 - d. Persons in "adult education" – over 40 years of age. These persons traditionally follow different educational trajectories, often times enrolled in short-cycle courses of one year or less, or among retirees learning programs aimed primarily for personal enrichment.
 - e. Persons enrolled in specific educational institutions outside the standard HE framework (e.g., Open University, academic preparatory, apprenticeships, special needs students, etc.).

Advantages of this indicator include:

1. Comprehensiveness – the indicator provides greatest level of detail of all the proposed indicators. Information can be gleaned *yearly* so that all embedded idiosyncrasies are accounted (even if unexplained) within the table (e.g., temporary leaves of absence). Similarly, all educational trajectory paths can be comprehensively completed providing a full picture of the course of student studies, theoretically at least, across the full educational career.
2. Timeliness – every year, starting with the first year after initial enrollment is covered. Hence, most recent cohorts for which data is available can be covered and compared to similar event time-frames occurring in the further past.
3. Flexibility – because no exact definition of “drop-out”/discontinuer is adopted the analyst can independently define what constitutes “termination” of studies in accordance with his/her theoretical framework.

Disadvantages of this indicator include:

1. Complexity – the information is presented in high detail which does not allow easy access for the simple, untrained user.
2. Ambiguity – the lack of definite boundary delimiting the constitution of “discontinued” /”drop-out” student presents difficulty for analysts who are interested in concrete status, as mandated by official statistical circles such as the UN, OECD.

In order to inform readers, a few working examples are presented below, taken from an ICBS publication on course of study matrices:

TABLE 1.- COURSE OF STUDIES OF FIRST DEGREE STUDENTS^(a),
BY YEAR OF BEGINNING STUDIES AND YEAR OF STUDY

לוח 1. - מהלך הלימודים של סטודנטים לתואר ראשון^(א)
לפי שנת התחלת הלימודים ושנת לימוד

Beginning year	Year of study															שנת התחלה	
	שנה חמש עשרה	שנה ארבע עשרה	שנה שלש עשרה	שנה שתים עשרה	שנה אחת עשרה	שנה עשירית	שנה תשיעית	שנה שמינית	שנה שביעית	שנה שישית	שנה חמישית	שנה רביעית	שנה שלישית	שנה שנייה	שנה ראשונה		
	Fifteenth year	Fourteenth year	Thirteenth year	Twelfth year	Eleventh year	Tenth year	Ninth years	Eighth year	Seventh year	Sixth year	Fifth year	Fourth year	Third year	Second year	First year		
	Percentage of those who studied in the specified year															שנת לימוד	
1980/81	0.7	0.7	0.8	1.1	1.3	1.8	2.3	3.4	5.5	9.1	18.9	44.3	68.8	77.0	100.0	תשמי"א	
1981/82		1.0	1.1	1.2	1.5	1.8	2.7	3.7	5.5	9.8	18.9	45.3	71.2	78.7	100.0	תשמי"ב	
1982/83			0.8	1.1	1.3	1.5	2.1	3.1	4.8	8.7	18.5	44.0	70.7	78.3	100.0	תשמי"ג	
1983/84				1.0	1.2	1.4	2.1	2.9	4.8	7.9	17.1	43.0	69.0	77.2	100.0	תשמי"ד	
1984/85					1.1	1.4	2.0	2.7	4.7	8.1	16.8	44.7	72.7	81.3	100.0	תשמי"ה	
1985/86						1.4	2.0	3.0	4.3	7.6	17.3	45.4	75.0	82.4	100.0	תשמי"ו	
1986/87							1.8	3.2	4.9	7.7	15.8	43.1	72.6	81.5	100.0	תשמי"ז	
1987/88								3.0	4.9	8.1	15.9	43.5	73.3	81.5	100.0	תשמי"ח	
1988/89									4.7	8.2	17.2	45.0	76.4	84.3	100.0	תשמי"ט	
1989/90										7.1	16.0	44.5	77.0	84.2	100.0	תשי"ן	
1990/91											15.4	46.6	80.0	86.7	100.0	תשי"א	
1991/92												45.0	78.7	86.0	100.0	תשי"ב	
1992/93													78.7	85.4	100.0	תשי"ג	
1993/94														84.6	100.0	תשי"ד	
	Percentage of those who did not study in the specified year															שנת לימוד	
1980/81	31.3	31.7	31.8	32.1	32.3	32.5	32.7	33.2	33.6	34.2	35.2	32.8	26.4	21.0		תשמי"א	
1981/82		30.3	30.6	31.0	31.3	31.7	32.0	32.6	33.4	33.7	34.3	31.7	25.0	20.0		תשמי"ב	
1982/83			29.6	29.7	29.9	30.4	30.9	31.4	32.1	33.0	33.5	31.4	25.1	19.9		תשמי"ג	
1983/84				28.1	28.5	28.8	29.0	29.7	29.7	31.1	32.2	30.5	24.7	19.9		תשמי"ד	
1984/85					24.6	25.0	25.3	25.9	26.2	26.9	27.9	27.2	20.9	16.5		תשמי"ה	
1985/86						23.8	23.9	24.2	24.9	26.0	26.7	26.0	19.6	15.3		תשמי"ו	
1986/87							23.1	23.1	23.7	24.7	26.0	24.9	19.5	15.5		תשמי"ז	
1987/88								22.5	22.7	23.9	25.5	25.0	18.5	15.2		תשמי"ח	
1988/89									21.5	22.6	23.0	22.8	17.4	13.3		תשמי"ט	
1989/90										22.0	22.9	21.9	16.3	13.5		תשי"ן	
1990/91											21.9	20.2	14.2	11.2		תשי"א	

TABLE 7.- FIRST YEAR STUDENTS FOR FIRST DEGREE IN 1982/83, BY STATE OF STUDIES AFTER FIVE YEARS AND BY FIELD OF STUDY AND INSTITUTION AT THE BEGINNING OF STUDIES, CHANGES DURING THE PERIOD OF STUDIES AND PREVIOUS UNIVERSITY STUDIES

	State of studies after 5 years								
	Interrupted studies					Studied			למדו
	אחרי 4 שנים	אחרי 3 שנים	אחרי שנתיים	אחרי שנה אחת	סך הכל	לא ברציפות	ברציפות	סך הכל	
After 4 years	After 3 years	After two years	After one year	Total	Inter-rupted	Without inter-ruption	Total		
GRAND TOTAL - Absolute numbers	655	602	655	1,887	3,799	495	840	1,335	
- Percentages	5.4	4.9	5.4	15.4	31.1	4.0	6.9	10.9	
Field of study at the beginning of studies									
Humanities	8.7	7.0	6.0	19.9	41.5	5.2	7.9	13.0	
General humanities	6.9	6.7	5.6	23.2	42.3	5.0	7.0	12.0	
Languages, literature & regional studies	9.0	6.8	5.6	15.3	36.7	6.3	8.6	14.9	
Education	8.3	5.9	8.1	16.8	39.0	2.4	8.3	10.7	
Changes during the period of studies									
Did not change field of study or institution	4.9	4.8	5.5	18.0	33.2	2.5	5.6	8.1	
Changed institution	9.0	4.8	4.2	0.0	17.9	14.0	11.8	25.8	
Changed field of study	8.5	6.2	4.6	0.0	19.3	8.8	14.1	22.9	
Changed field of study & institution	7.0	4.2	3.1	0.0	14.3	25.5	18.7	44.2	
Previous university studies									
Did not study	5.3	4.9	5.4	15.6	31.2	4.1	7.1	11.2	
Studied	6.2	5.5	5.2	12.9	29.7	3.9	3.2	7.1	

TABLE 3.- FIRST DEGREE RECIPIENTS(a), BY YEAR OF BEGINNING STUDIES, NUMBER OF YEARS UNTIL RECEIVING THE DEGREE AND FIELD OF STUDIES IN THE FIRST YEAR OF STUDY

לוח 3.- מקבלי תואר ראשון^(א), לפי שנת התחלת הלימודים, מספר שנים עד קבלת התואר ותחום הלימודים בשנת הלימודים הראשונה

	הנדסה Engineering	חקלאות Agriculture	מדעי הטבע ומתמטיקה Science and mathematics	מקצועות עזר רפואיים Para- medical studies	משפטים Law	מדעי החברה Social sciences	מדעי הרוח Humanities	סך הכל Total	
אחוז (מצטבר) מהמתחילים ללמוד בשנה הנקובה Percentage (cumulative) of those beginning studies in the specified year									
1980/81									תשמ"א
Up to 4 years	9.1	53.1	30.2	29.6	2.2	32.1	18.1	22.9	עד 4 שנים
Up to 5 years	58.7	71.9	49.4	62.8	49.2	49.0	34.3	45.9	עד 5 שנים
Up to 6 years	73.0	75.8	58.4	68.6	73.5	58.0	44.0	56.3	עד 6 שנים
Up to 7 years	78.2	77.0	62.4	72.6	81.7	62.1	48.9	60.9	עד 7 שנים
Up to 8 years	80.3	79.3	64.4	72.6	84.9	64.6	51.6	63.3	עד 8 שנים
Up to 9 years	81.1	79.8	65.9	74.9	86.0	65.9	53.8	64.9	עד 9 שנים
Up to 10 years	81.7	80.0	66.8	75.9	86.3	66.4	55.0	65.7	עד 10 שנים
1981/82									תשמ"ב
Up to 4 years	6.3	55.6	30.1	29.8	9.5	32.0	16.9	23.1	עד 4 שנים
Up to 5 years	61.3	69.5	50.5	61.6	40.4	51.7	33.5	46.8	עד 5 שנים
Up to 6 years	74.5	74.4	58.4	72.5	65.8	59.9	42.5	56.5	עד 6 שנים
Up to 7 years	78.8	76.3	62.2	74.0	77.8	64.2	47.8	61.2	עד 7 שנים
Up to 8 years	80.2	77.5	64.9	75.2	79.1	66.3	51.1	63.6	עד 8 שנים
Up to 9 years	81.3	78.5	66.7	76.0	80.4	67.3	53.8	65.3	עד 9 שנים
Up to 10 years	81.3	79.3	68.6	76.7	81.7	68.1	55.3	66.5	עד 10 שנים

4. Discussion

This work documented here sought to develop indicators that can describe the undesired early termination of higher education studies without degree attainment. Such an indicator is valuable in order to provide educational policy makers and administrators necessary tools to develop and implement specially targeted intervention aimed at low achieving sub-populations. After conducting a review the international experience in this matter, it was discovered that treatment on this topic was relatively scarce. Moreover, the two countries known to deal with this topic (Finland and The Netherlands), show very different institution contexts from the Israeli case, explaining why for these countries only a single, short-term indicator was adopted. To wit, both countries publish results on discontinuation only one year after initial enrollment and this likely stems from the fact that because of generous financial assistance to students, strict limitations are placed on temporarily and undocumented leaves of absences. In Israel, no stringent financial accounting practices are instituted at the higher education system level and certainly not among the national statistical bureau (ICBS), which attains enrollment data from the admissions offices of each learning institution (rather than from the payroll/fee offices). Consequently, we at the ICBS are seeking to develop indicators that are *relevant* to local needs, but at the same time can also fit the requirements of international statistical agencies.

The results of our project have provided us with a comprehensive solution that recommends three different indicators, each catering to a slightly different user, and which together paint a complete picture on HE discontinuation. The first indicator is a simply "rough" measure of discontinuation taken one year after initial enrollment. Despite the potential for marginal inaccuracy its timeliness makes this a very helpful indicator to HE administrators seeking to gauge the quick response of recent policies.

The second indicator is useful as a longer-term measure tied to local (Israeli) HE field of study contexts. This localization (of degree length periods) for particular fields, as

determined by Israeli HE governing authorities in point of fact standardizes discontinuation statistics since time years are thereafter nullified from the indicator. Furthermore, while the OECD does not currently publish figures within this paradigm, it does provide similar rates in the form of rates of degree attainment in relation to standard degree time. So while this discontinuation measurement methodology does not fully conform to OECD standards, the distinctions between the two are minor, enabling informed users the ability to use data at a cross-national analysis.

Finally, the last measure is in fact a full-scale follow-up of student enrollment within the *entire* HE system. As such it provides a comprehensive picture of the HE life-cycle, publishing cohort rates of completion/discontinuation, crossed with theoretically relevant analysis variables. In order to maximize the usefulness of this measurement strategy, we recommend that multiple cohorts are analyzed, with at least several cohort years followed to a minimum of 6-8 years after initial enrollment. We thus envision this indicator primarily within full-scale analysis publication reproduced every 8-10 years and a target audience of advanced users such as researchers in HE field.

MR10 - Twinning activities B.3

Component: Education Statistics

Sub-component: Adult Education Statistics

MR10: Plan for development of adult education statistics and its integration into the Register of Educational Attainment

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1 Summary description of the Twinning activities

During Activity B5, ICBS described its ongoing projects and data collections in the area of adult education and training, and discussed challenges as for definitions and coverage. One of the main concerns is to devise ways to include data on adult education and educational attainment as part of ICBS' education register.

The MS Experts assessed the *Education Register* of ICBS (the database called ISOPED) which is still not fully developed, so the assessment is based only on a partially implemented idea or vision.

The MS Experts consider the ISOPED to be a visionary way to organize the micro data in ICBS. The ISOPED could be a solid foundation for combining and integrating various different sources to establish, for instance, the highest educational attainment in the Israeli population – combining for instance qualifications obtained in the area of Adult education with qualifications from ordinary educational programs.

The MS Experts have two minor comments regarding the detailed organization of the ISOPED:

- 1) Instead of for one separate record for each year in the educational program – one record with a start and end date could be considered as a way of saving space and running programs much faster.
- 2) Instead of storing almost all variables in the same register (or entity) it could be considered working with more entities where all variables could be filled out (currently many variables for many individual records are empty because not all individuals have activities in adult education for instance). Again this data structure would require less space and it would ensure a faster and smoother execution of all the programs.

2 Background

ICBS produces statistics on all levels of formal education and reports it to international organisations, but there are lots of data collected from many sources, not harmonized or organised in a unified manner, which pertain to the area of adult education, and could be considered to be "non-formal" education. ICBS is interested in organizing these data in a unified matter, among other things so as to better account for these kinds of educational programmes when producing statistics on educational attainment.

ISOPED is the data tool being implemented in ICBS for harmonizing education data into one education register, so it would seem a useful idea to emphasize the possible uses of this system in harmonizing adult education and adult educational attainment, as part of a wider assessment of this system which is soon to become functional.

3 Conclusions and recommendations

The following recommendations were provided during the project:

Prioritize to build an Adult education register based on micro data

- 1) Organization of data
 - a. Secure a longitudinal structure in data
 - b. Make sure data can easily be integrated with ISOPED at some point
- 2) Standardization
 - a. Take into consideration variables available versus desired variables
 - b. Consider desired data controls
 - c. Analyze, how matching between entities can be executed

Integrate Adult Education register with the Education register (ISOPED)

- 1) Build a qualification register potentially inspired by the Danish set-up
- 2) Long term planning regarding integration within ISOPED
 - a. New separate entities or variables within the existing register and so on?

Surveys

- 1) Integration
 - a. Integrating surveys with micro data is not recommended as an objective but rather something that should only be done when micro data needs to be supplemented
 - b. In general surveys and micro data are recommended to be published separately – or as separate as possible where you can make clear distinctions in the description – for instance for a specific institution use either micro data or survey data instead of both
- 2) International comparability
 - a. For purposes of international comparisons it is recommended to use the standardized surveys aimed at this. In the area of Adult Education for instance: LFS, PIAAC, AES and CVTS
- 3) Overlapping data
 - a. Integration of survey and micro data is not recommendable especially when it leads to uncertainty regarding the coverage of each type of data and therefore uncertainty whether some students have been counted twice
- 4) Mapping of existing national educational programs
 - a. Explore
 - i. Invite relevant stakeholders to participate in exploratory seminars
 - ii. Explore areas of mutual interests between ICBS and stakeholders, e.g. new indicators, data exchange, micro-data access etc.
 - b. Build national educational program register
 - i. Include all educational programs within the ordinary and adult education system
 - ii. Establish unified coding for each educational program
 - iii. Include all relevant information regarding the programs, e.g. ISCED levels, resort ministry, length of program, admission requirements (years of study, type of exams etc.)
- 5) Yeshivas and Kolels
 - a. These types of activities do not fall within standard definitions of an educational program (no completion or drop out, no grades, no final exams, etc.)
 - b. Instead these activities could be compared with an occupation with a feel of calling to work in this area; for instance to work as a priest, or a nun, nurse, researcher etc.
 - c. MS recommends to consider including these activities as a part of the labour market rather than an educational program
- 6) Presentation of indicators
 - a. Prioritize enabling access to micro-data for researchers, ministries and others and making the access as smooth as possible.
 - b. Fixed indicators can of course be useful for many general purposes but most of the important stakeholders needs micro-data to make new indicators according to what is on the agenda
 - c. Examples of Danish indicators in the area of Adult Education can be found in the presentation (Annex B1.6) and the document (Annex B.12).

4 Implementation of the mandatory results

4.1 Co-operation with external partners

Twinning Activity B5 brought together representatives from different areas as potential partners for the development of statistics of adult education. Especially it was a catalyst for beginning fruitful co-operation with the Ministry of Economy as well as the Ministry of Education's Department of Adult Education.

In the case of the Ministry of Economy, there is a strong demand for statistics on VET (Vocational education and training). An initial bilateral meeting has been held with Ministry representatives in October, with very promising results aiming at co-operation in different projects.

The Ministry of Education is about to provide microdata containing the Ministry's educational programmes for adults.

A draft report regarding the scope of the future Adult Education statistics is about to be sent to the stakeholders. The draft will discuss the pros and cons of the different alternatives, the scope and the expected quality of the statistics in the light of the available data sources, and the report will also prioritize among the different alternatives and the order in which they may be implemented. During the month of November 2014 it is expected to have input to draft report received from stakeholders.

4.2 Developed indicators – preliminary data

Following the recommendations, the following has been decided, implemented and achieved:

Prioritize to build an Adult education register based on micro data: The director of the ISOPED and Education Register Sector at ICBS has been involved in the project, making sure that data on adult education can easily be integrated with ISOPED at some point. Initial discussions with this unit have started so as to implement recommendations within the existing logic of ISOPED, without the need of actually creating new whole "entities", but rather using adapted views and possibly adding new tables to the database's structure.

Surveys: The recommendation to publish separately data from surveys and micro data is being implemented. Existing data tables with such a mix of data sources have been identified, and the data presentation at the upcoming edition of the Statistical Abstract will make sure that a clear distinction is made, using separate columns.

Another process has been initiated, aimed at estimating the degree of overlap and double counts between adult education survey and micro data.

ICBS has begun to investigate the possible uses of two European adult education surveys (AES and CVTS) for collecting data on adult education.

Mapping of existing national educational programmes: Together with the ISOPED Sector, initial discussions have begun on the best way to collect metadata for creating two tables, which would serve a twofold purpose:

1. Function as the national educational register of programmes and qualifications, in the absence of a National Framework of Qualifications, and thus include all relevant information: ISCED levels, supervising ministry, length of program, admission requirements
2. Integrate the ISOPED Education Register so as to systematically map and include all educational programs within the ordinary and adult education system, with a unified coding for each educational program.

Yeshivas and Kotels: Following recommendations, a decision has been made not to put specific resources into integrating these programmes into adult education. Statistics on these will continue to be published separately.

4.3 Presentation of detailed plan towards publishing the results

A detailed draft work plan (in Hebrew) is being finished these days, with three main emphases drawing on the activity's recommendations:

1. Strategic goals for statistical coverage: Instead of seeking to define and identify the theoretical categories for statistical coverage, the proposed strategy is to seek to cover two main areas:

- Adult education either provided or supervised by government agencies, which is expected to be of good quality and available as micro data
- Vocational education and training (VET) for adults, for which there is specific demand and interest by the Ministry of Economy

2. Use of survey data: With the purpose of seeking international comparability in the area of adult education, it is planned to learn thoroughly the potential of two main European surveys: AES and CVTS. Within a year it would be possible to put forward recommendations as for the need to run such surveys in Israel, or to adapt existing local surveys so as to make their results internationally comparable.

3. Strategies for integrating adult education into the ISOPED-based Education Register: Joint planning together with the ISOPED Sector as for two main variables in the Register: "Currently in adult education" and the Adult Education history of a person.

This work plan is to circulate among the activity's participants (mainly Ministry of Education and Ministry of Economy) towards its final approval at ICBS.

MR11 - Twinning activity B.4

Component: Education Statistics

Sub-component: Research and Development Statistics

MR11: Strategy for the development of indicators on personnel and positions engaged in R&D

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List of Abbreviations

BC	Beneficiary Country (Israel)
ICBS	Central Bureau of Statistics (Israel)
HE	Higher Education
DS	Statistics Denmark
CHE	Council for Higher Education
MoE	Ministry of Education
FM	Frascati Manual
HERD	Higher Education Research and Development

1 Summary of the project.

Two projects were undertaken within the Twinning framework in the ICBS, Higher Education Follow-up and Course of Learning Branch, including:

3. B2 (dropout indicator sub-component) – Higher Education non-completion statistics (under the general realm of HE indicators).
4. B4 – Estimation of personnel engaged in R&D related work within the HE sector.

Both can be classified as *project development* work comprising of theoretical and practical tasks aimed at establishing serial statistical outputs in the future that are either mandated by the OECD (for B4), or are deemed valuable for our organizational beneficiaries (B2). Towards this aim, the projects were aided through recurring consultations with our Danish partners which included three mission visits (two for B2 and one for B4).

Mission visits enabled subject matter to be effectively exchanged, both through formal presentations and informal discussions (4 presentations were delivered from our end and 2 from SD). Additional homework, after the mission visits, was undertaken by SD in the form of dissemination of (additional) relevant material (and some review of our work). From our side, analysis papers were written for both Twinning projects. In addition, an in-depth pilot project was conducted aimed at learning and testing in the field estimation methodologies, necessary for bringing the end product of B4 to full fruition. Finally, we conclude the project by submitting culminating summary documents, detailing the planning necessary to realize these two project aspirations. More specifically, we submit the following documents:

3. “Indicators and Measurement of Discontinuation from Higher Education” – Twinning B2 Summary Document.
4. “Higher Education Research & Development Personnel Estimation” – Twinning B4 Summary Document.

These two documents detail the project final product.

2 Background

In order to meet OECD statistical outputs, the ICBS disseminates annual figures on personnel and FTEs actively engaging in R&D work in accordance to the OECD Frascati Manual (FM) guidelines. However, these figures are generated and published by several ICBS departments, each covering a different national employment sector. Unfortunately, the statistics relating to R&D personnel in the higher education sector show partial coverage and require revision to improve both their quality and breadth. More specifically, we believe that improvements are required to improve coverage of other junior R&D researchers such as advanced research students as well as non-researcher R&D auxiliary manpower, as mandated by the FM. In addition, current statistics do not disseminate R&D personnel figures in full-time equivalencies (i.e., job positions or FTEs), also mandated by the OECD FM. In order better to fulfill our expectations we utilize the Twinning B4 project development framework and re-engage this topic afresh, reviewing the current ICBS and international experience, propose an estimation methodology and attempt a real-world estimation pilot that most feasibly exploits our existing data sources toward our aims.

The purpose of the B2 and B4 missions was to assess the current situation, to identify problems and indicate possible solutions to solve them. During both sessions an overview of the current situation was first presented, followed by discussions and consultations that culminated with presentations of general recommendations by our Danish partners. More specifically, four presentations were presented from our department: 1) a general overview of our department statistical production; 2) a theoretical presentation on the problematic nature of defining, analyzing and presenting HE dropout statistics (for B2); 3) a presentation highlight potential solutions to our problem of non-completion statistics; 4) a detailed

presentation of data sources and methods potentially useful for estimating personnel engaged in R&D activities within the HE sector (for B4).

3 Conclusions and Recommendations

The following recommendations related to MR11 have been provided during the project:

- a) ICBS statistics concerning R&D in the business sector and PNP sector is more or less in compliance with the OECD, with a question on the inclusion of gender as a variable in the business survey. For the higher education sector the situation is not equally good: There is a need to focus first on the Higher Education Sector, and then on the Government Sector. This prioritizing is recommended as it is the MS Experts' anticipations that R&D is more prominent in HES than in GOV.
- b) Among the HE sector, estimation should be attempted through the following strategy:
 - a. Choose the data source among the relevant sources for HES with the highest overall coverage for the relevant/most important variables.
 - b. Analyse at detailed level how much of the data reporting to the OECD can be done from this single source.
 - c. Analyse what of the other available data for HES sources could be used to fill in the remaining cells – either as a supplementary source or as part of the quality assuring (e.g. through consistency checks).
 - d. Decide on the type of assumptions that would be needed to comply with the OECD recording – e.g. use of one source to distribute data from another source on field of science.
 - e. If needed, collect additional information on ad-hoc basis from e.g. colleges etc.
- c) In the long run, the recommendation would be to conduct a specific R&D survey concerning the higher education sector and the government sector (see Danish questionnaire).
- d) Coordination between ICBS Departments involved in R&D statistic to develop the methodology, including the necessary assumptions for estimations.
- e) Dissemination: Improve the web site so data regarding R&D for Israel is easy to find.
- f) Timeliness: There is a need for more timely data. Annual data should be published no longer than one year after the reference year. If the quality assurance of the data cannot be met in time for this, the use of preliminary data could be considered. (In Denmark, at the most aggregated level the difference between the preliminary and the final figures are not very big, around 1-2 per cent, while the revisions can be more substantial at detailed level).
- g) To have metadata and documentation available at the same time as data are published. This is important for users and for ICBS, also in a strategic perspective regarding the long-term development of the R&D statistics.

4 Implementation of the mandatory results – sources and methods

4.1 Cooperation with the Council for Higher Education and Ministry of Science.

There are on-going contacts with the CHE on a variety of topics which we deal with (e.g., Lecturer staff in HE, pre-academic preparatory courses, etc.), and we have held informal discussions also on the topic of HE R&D personnel estimation. As for the Ministry of Science, there has been a change of contact person recently and we are set to meet this new person soon. In any case, we would like to have a formal discussion on this project with both parties only after the pilot project as received a full hearing within other ICBS departments and from our Danish partners.

4.2 Estimation methodology adopted suited to our data sources and technical capabilities. After searching and reviewing a host of different country strategies for estimating HERD, we adopted the Statistics Canada methodology that is relatively similar to what we are able to achieve with our current data sources. Namely, this method adjusts administrative data (for headcounts) with time-use surveys (for measuring FTEs) that are collected by the ICBS. In order to estimate, non-research R&D personnel (e.g., technicians and auxiliary support staff) which are oftentimes not found or directly defined in the administrative files, the method uses the national census enumeration to determine ratios of research to non-research populations and which themselves enable non-researcher personnel to be indirectly estimated. Toward our aim of learning this method in depth, a document (in Hebrew) critically reviewing this method was prepared.

4.3 Conduct Pilot for estimating R&D personnel in higher education. A real-data pilot study was conducted based on the estimation methodology developed in Statistics Canada. The pilot successfully measured headcounts and FTEs of researcher personnel including among student researchers as distinguished by key analysis variables mandated by the OECD FM (e.g., sex, field of science, etc.). In addition, non-researcher R&D staff was estimated based on adjustment ratios derived from the 2008 Israeli census. Unfortunately, we did not succeed in estimating all non-research R&D FTEs, but we are hopeful a solution can be applied in the full estimation.

4.4 Presentation of results of pilot. A lengthy, detailed document was written on the pilot, and was submitted to other ICBS departments and to our Danish partners for critical review. The Twinning B4 summary document highlights our experience using this methodology in a detailed pilot study conducted toward this aim. Finally, the concluding “Discussion” chapter of this document highlights where our estimation efforts now stand and what improvements we envision for the future in order to bring a statistical series in compliance with OECD FM standards to fruition. In addition, a formal frontal presentation is series planned in the near future, initially in our departmental seminar.

4.5 Future perspectives, including possible future data sources. We have received and are continuing to study the survey that Statistics Denmark uses for collecting data on HERD personnel (and used for estimation purposes). The survey was graciously translated to the English language by Mr. Thomas Bie.

5 Impact

The impact of the project has been tremendous in moving this topic forward, given that no advanced work was done in the past on HE R&D personnel estimation. Prior estimation work was performed piecemeal with the result that submission to OECD was quite partial. As a result of this project, valuable experience was gained in learning the data sources, foreign experience, the definitions and methodology employed and presentation of results. Consequently, after performing a fully-fledged pilot project on real data, it will now be possible, in the next development phase, to attempt a large-scale estimation exercise to be submitted to a ICBS steering committee (for final authorization).

6 Follow-up and Sustainability

Given that fact that the current situation is not sustainable (i.e., OECD requirements for R&D HE personnel are only partially covered), it is expected that a new full estimation, based on the twinning pilot will ensue shortly. At the same time, as the pilot was performed only on a select sub-population (i.e., university lecturers), some unwelcomed surprises may be incurred when expanding the estimation to the full HE R&D study population. Despite this, and given the high importance placed on this project, we are fully committed to pursuing a full implementation of this project whatever the difficulties.

7 Conclusions

The following outcomes have been achieved as a result of the project:

- a. Pilot estimation conducted on real data.
- b. Draft document detailing pilot estimating of personnel working in R&D (both headcounts and FTEs) written and submitted for review.

8 Methodology on drop-out

8.1 Introduction

This paper documents a preliminary pilot undertaken in the ICBS with the aim of estimating personnel engaging in R&D activities within the Israeli higher education sector (HE). As such it is a preliminary attempt to exercise the ideas gathered by our staff during the twinning workshops together with past experience gained in our department. More specifically, the aim is to estimate the number of persons in both headcount and person year position terms, who assist or perform R&D in HE, while adhering to internationally accepted standards mandated in the OECD Frascati Manual (FM).

In order to simplify the estimation, while we practice and learn, we limit the scope of this pilot to estimation within the Israeli university sector alone. Aside from comprising the bulk of R&D activity in the HE, the universities possess the best data coverage quality and are sufficiently similar to other HE institutional settings to enable inference across the entire HE sector. Hence, our strategy is master estimation techniques using the “best case scenario” in order to facilitate clarity and identification of significant challenges. At the same time, we touch upon the other HE frameworks as well in an attempt to analyze and anticipate the special treatments required for these institutional settings.

8.2 Background and Basic Guidelines

8.2.1 Main objectives, coverage and preliminary definitions

8.2.1.1 Primary Objective

In accordance with FM our primary objective is to:

1. Identify persons actively engaged in R&D in the Israeli higher education sector.
2. Count these persons as single units (i.e., headcounts – one head per person).
3. Count the time units of persons actively engaged in R&D in standardized units. Here the unit is full-time position (i.e. Full-Time Equivalencies) defined in relation to the work-week, over the *full calendar year*. For example, persons engaged in $\frac{3}{4}$ of full-time work and only for nine months are counted as: $(0.75) \times (0.75) = 0.5625$ FTEs. A summation of all persons-year FTEs will therefore represent the totality of FTE R&D positions in the country per calendar year evaluated.

Estimation of these counts is for the **2012 calendar year** (January to December) **alone**.

8.2.1.2 Population universe

In accordance with the FM, our population universe comprises three types of occupations-activities including:

1. **Researchers** which are “professionals engaging in the conception or creation of new knowledge, products, processes, methods and systems and in the management of the projects concerned.” Within the higher education sector, this group consists of full and part-time academic staff, visiting scholars, post-doctoral research fellows, doctoral student and master’s degree students¹⁰ who are on identifiable research thesis track programs.

¹⁰ This includes only Master’s Degree students in the universities. There is currently no collection of this information within the Israeli academic colleges, but it is likely to be of lesser consequence as the more occupational orientation of this academic framework precludes most research-training tasks.

2. **Technicians and equivalent staff** comprise of “persons whose main tasks require technical knowledge and experience in one or more fields of engineering, physical and life sciences, social sciences or humanities.” They perform tasks involving the “application of concepts and operational methods, normally under the direct supervision of researchers.”
3. **Other support staff** include “skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects or directly associated with such projects,” normally under the supervision of researchers.

8.2.1.3 Institution and activity boundaries

In order to capture the above personnel it is necessary to pre-define the institutional boundaries in which R&D takes place within the Israel higher educational sector. As mentioned earlier this pilot only pertains to Israeli universities. However, we recognize that our ultimate goal, in accordance with the FM, is to cover R&D personnel also in the remaining state-accredited HE academic institutions including academic colleges, academic teacher training colleges and the Open University. Diverging from the FM guidelines, we **do not include hospitals** (government or private), government research institutes, or other bodies not directly administered by higher education establishments¹¹.

We recognize that R&D in less significant amounts may also take place in other post-secondary “boundary” institutions not under full/direct university control (e.g., semi-private think-tanks and institutes, non-academic technological colleges, etc.). Notwithstanding, this pilot excludes these bodies from its framework because they are either measured separately by other ICBS departments (i.e., business R&D statistics) or are characterized by low-levels of R&D activity. Nevertheless, we recognize that these other frameworks warrant tracking in order to make sure that new developments are attended to by at least one ICBS department.

8.2.1.4 R&D Time-Share definitions

In accordance with FM guidelines, only time **directly devoted to R&D** is counted toward R&D FTE measurements. Because most persons involved in R&D research also perform other non-research tasks, it is therefore necessary to isolate and measure only the relative share of work-time utilized in R&D. Among persons holding a PhD degree and considered researchers *de jure* by the FM, this relative share is determined empirically by means of information gleaned from external time-use surveys (described in the next section). In contrast, among student researcher populations learning toward an MA or PhD degree, we pre-determine this amount via *a priori* assumptions based on our limited personal¹² knowledge of HE graduate study (see assumptions section). In the future, we aspire to improve this knowledge through intensive consulting with university officials and/or survey data collection.

8.3 Data sources and file time relevance

In order to determine R&D activities, this pilot utilizes a combination of administrative files and time-use surveys for its data. Given our purpose to estimate R&D activity for the 2012 calendar year, the most recent year with available data, we naturally restrict all input data files covering 2012 events. In contrast, the time-use surveys are from 2009 but we assume that their data is applicable over the short-medium term (see assumptions section ahead). The data files are described as follows:

¹¹ These frameworks are measured separately by the ICBS macroeconomics statistics division (Ms. Nava Brenner).

¹² The author, Dan Scheinberg, maintains personal contacts with a group of student PhD and MA researchers in Israeli universities.

8.3.1 CHE teaching and research staff file

The council for Higher Education (CHE), which regulates and accredits academic education in Israel, collects data on most of the salaried researcher and lecturer employees in the Israel higher education system including¹³: universities, the Open University and academic colleges (both publicly and privately funded). Consequently, we are able to achieve near-universal study population coverage simply and efficiently through this administrative file source. Nevertheless, from this source we remove particular sub-populations that are either: counted more directly in other data sources (i.e., PhD and MA student researchers, see section 4.2) or are removed entirely from our researcher population (i.e. clinical doctors who teach in university medical schools and who are enumerated outside the HE sector by a different ICBS department). Like all of our data sources at the individual level, the file contains a unique ID number which is universal across data files, enabling easy, high-quality record linkage between sources¹⁴. Finally, this data source contained analysis variables recommended for tabulation by the OECD, including: field of science¹⁵, sex and geographic region of R&D activity.

8.3.2 University PhD and MA (thesis track) student file

In order to capture student researchers, we utilize an administrative file of enrolled students from all academically accredited HE institutions in the country. Student researchers are restricted to records of PhD students and MA students formally enrolled in thesis (research) tracks. We also include medical students as researchers if they completed their 4th year of student enrollment (i.e., 1st year of MA studies). Finally, like the university lecturers file above, this file contained supplementary analysis variables (i.e., field of science, sex, geographic region, etc.), required for compliance with FM publishing guidelines.

8.3.3 University senior lecturers time-use survey and PhD holder's survey

In order to measure FTEs in R&D, we rely on two time-use surveys conducted among overlapping researcher populations including: 1) university senior lecturer staff¹⁶; 2) careers of PhD holders¹⁷ in Israel. Both surveys, collected in 2009 at the individual-level, measured relative time shares (from total work time) devoted specifically to R&D activities (as opposed to other activities such as teaching, administration, etc.). Similarly, both surveys collected data on the share of time devoted by *type* of research undertaken (basic, applied, experimental development), enabling further distinctions to be estimated as mandated in the FM.

Given that the PhD holder's survey sampling frame almost fully corresponds to the university senior lectures time-use sampling frame we could, theoretically speaking, elect to work with a single PhD holder's survey. Nevertheless, we expect that doing so will increase our overall sampling error bias unnecessarily (by reducing sample size). Instead, we use the university senior lecturers survey among university senior lectures alone, and the PhD holder's survey among non-senior and non-student researcher populations. Similarly, in the future we expect to utilize this survey to provide R&D time-shares in non-university HE settings as well (i.e., academic colleges, Open University, teacher-training colleges) (see discussion section for elaboration).

¹³ Researchers in the academic teacher training colleges are covered in a separate file administered by the Israel Ministry of Education. The file contains similar information but since this institutional framework is not covered in this pilot, no preliminary data quality evaluation has been undertaken.

¹⁴ Missing values in the analysis variables in both the student and the university research files were completed by record linkage to the universal Israel Central Population Registry file.

¹⁵ We aggregate field of science in line with OECD requirements (see appendix table 3), which differ somewhat from ICBS aggregation.

¹⁶ For further information see ICBS publication number 1430 (2011), "Teaching and Research Activities of Senior Academic Research Staff 2008/9". Jerusalem, Israel.

¹⁷ For further information see ICBS publication number 1512 (2013), "Careers of Third Degree (Doctorate) Holders 2009."

8.3.4 2008 Israel Population Census

In order to attain information on the number of headcounts employed as technicians and other auxiliary support staff we gather data on employed persons in the 2008 census with the HE sector. More specifically, the 2008 Israel census, sample-survey enumeration collected population data by occupation and industrial branch, enabling aggregate counts to be compiled for R&D workforce in HE settings. Further information on the use of this source toward our estimation ends is described in the methodology section (section 5.2).

8.3.5 Future files that we expect to use

Aside from the files listed above, there are two additional sources which we expect in the final estimation to utilize, but which were not available to us for this pilot including:

1. Post-doctorate research fellows. This file contains XXXX additional cases per year and hold information on the following background variables.
2. Researchers awarded research grants from the university research authorities. The file lists the names and id numbers of researchers who partake in research projects.

Both files are important by potentially providing additional researchers directly measured, who were missed in our other two main researcher files discussed earlier (see section 4.1 and 4.2).

8.4 Estimation Procedures

8.4.1 Expected final output

In order to enhance clarity before we describe the detailed estimation procedures, it is helpful to list our expected final product – estimates for R&D personnel by the following analysis classifications including:

1. Unit of measurement (headcount, FTE)
2. R&D occupation (researcher, technician, other support staff)
3. Sex (male, female)
4. Field of science (Humanities, Social Science, Natural Science, Engineering, Agriculture, Medical Sciences)
5. Type of research (basic, applied, experimental development)
6. Educational qualification level (PhD., other tertiary, post-secondary, secondary)

Notwithstanding, OECD publication *minimum requirements* actually collapse the above variables into a smaller group of 4 nested levels of analysis. These are summarized in the following statistical tables:

1. Measurement Unit X Sex X R&D Occupation
2. Measurement Unit X Sex X Educational Qualification
3. Measurement Unit X Sex X Education – for R&D researchers only
4. Measurement Unit X Sex X Faculty of Science – for R&D researchers only

8.4.2 Methodology

In keeping with the Canadian R&D personnel estimation, we employ several, very different methodologies in this pilot, each tailor-made to a different R&D personnel (researchers, technicians, auxiliary staff). Furthermore, there are also differences and similarities between each group with regard to headcount and FTE measurements.

8.4.2.1 Methodology for estimating R&D researchers

Researcher headcounts are actually simple aggregated tabulation counts derived directly from our individual level data files (university lecturers/researcher, student researcher files). Because the university lecturer payroll file (ULPF) is constituted at the job-position level, we collapse and merge all multiple instances of jobs per persons (working at either two or more institutions-departments) into one unique record. Where required, analysis variables were

cleaned and completed from the higher quality Central Population Registry file, administered by the Ministry for the Interior.

In order to eliminate duplicate counting, we remove any researchers from the UNLP that are concurrently listed in the student researcher files (SRF), preferring to count student researchers from that source. This preference is instituted in order to maintain consistency with all student researchers (i.e., those who do work for the university, but nevertheless study for a research degree) and because the SRF is characterized by better overall data completion/quality when compared to the UNLP. In the future we expect to add two additional files to our researcher pool including, post-doctorate fellows and researchers partaking in R&D funded by university research authorities, after similarly removing any cross-source duplicates (via ID record linkage).

In order to estimate researcher FTEs we require additional information, namely coefficients of: time devoted solely toward R&D work, time by type of R&D work, and ideally also measures for overall work-time. This information is available to us at the aggregate level¹⁸ via the two researcher time-use surveys, which we apply to our headcounts. More specifically, we calculate FTEs by multiplying the headcount figure, by a coefficient representing the fraction of the full job (in average terms) due to specific factor *n*, thus giving us a summary figure of total *job-position time*. In all there up to 2 multiplication factors operated in this pilot (i.e., for R&D time, for R&D type) and an additional factor (i.e., for overall position-time), which we hope to add in the future. To wit, headcount table cells are crossed with coefficient table cells, keeping fixed all analysis variables (i.e., sex, field of science, educational qualification level). Theoretically, this multiplication operation can be expressed by the following mathematical formula:

Calculation of final estimates was undertaken in practice

$$\sum_{i=1}^n a b c (d)$$

Where:

- a* is a table of headcounts by field of science (rows), sex (column) and education level (column)
- b* is a table of coefficients of average time devoted to R&D tasks by field of science (row), sex (column) and education level (column)
- c* is a table of coefficients of average time devoted to *types* of R&D research by field of science (row), sex (column) and education level (column)
- d* is a table of coefficients of average total time devoted to employment in general in relation to standard work week in particular occupations (full-time) research by field of science (row), sex (column) and education level (column)

In this pilot we could not access the original (individual-level) time-use survey data files for this pilot and so all coefficient tables were directly taken from the ICBS *paper publications* which unfortunately did not nest all analysis variable levels together comprehensively. Consequently, FTE estimates could not be produced by sex for some analyses. In similar vein, we were not able to further FTE accuracy in the pilot by incorporating full-time/part-time job specification since aggregated R&D coefficient tables by total weekly hours worked were not published. Nevertheless, in the final estimation we expect to be able to produce exhaustive coefficient tables in order to all main OECD publishing requirements.

¹⁸ Both time-use surveys (and the 2008 Census) are random samples of researchers so it is not possible to conduct estimation directly from the individual-level records alone. Furthermore, these sources don not correspond time-wise to the personnel administrative files (2009 vs 2012). Consequently, we have no choice but to lose some accuracy and estimate FTEs using grouped data. Nevertheless, in the future we hope to evaluate the impact of this strategy, by conducting small-scale estimations (for 2009) using both individual and grouped data for comparison.

8.4.2.2 Methodology for estimating R&D technicians and auxiliary staff

The FM requires estimation of other staff assisting fellow researchers in performing R&D work, namely technicians and other auxiliary staff such as “skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects, etc.” In order to measure this personnel grouping we rely on estimation methods developed by Statistics Canada¹⁹. Under this methodology, R&D non-researcher personnel are estimated *indirectly* by applying the ratio of researcher to non-researcher personnel, calculated separately from 2008 Israeli census enumeration, to the researcher headcount estimates calculated beforehand from the UNFP/SRF data source (described in 5.2.1).

This circuitous method is employed because unfortunately we have no data collections specifically capturing R&D technician and support staff personnel²⁰ in HE sector. It goes without saying that this method relying on the subjective and often time proxy responses from the 20% census sample survey, is expected to show less accuracy overall when compared to the higher quality administrative data used for researchers. Nevertheless, we use this method since it does provide a solution to our problem (see discussion section later on).

In order to calculate the ratio of researcher to non-researcher personnel we first tabulate headcounts, as captured in the 2008 Census file, in accordance to FM mandated analysis variables (i.e., occupation, highest educational level attained and sex). These headcounts are then reassigned to different R&D personnel categories in accordance to their level of education and detailed occupational code. After re-tabulating the resulting cases into a new table of headcounts by R&D personnel (researchers, technicians and auxiliary staff), we measure the ratios between the researcher cells to the technician and support staff cells and place these in a separate ratios table. Finally, we multiply these ratios to the final researcher headcounts, derived earlier from the UNLP and SRF data sources.

Among auxiliary support staff, there is an added complexity because these cases comprise nearly entirely of *general* secretarial jobs²¹ (not associated with particular field of science); we therefore re-distribute the total number of these jobs by field of science in accordance to the relative share each field spends in R&D overhead expenditures (derived from a separate source). This methodology is covered in the much greater detail in estimation section ahead (see section 6.2)

8.4.3 Assumptions

In this pilot estimation we make simplifying assumptions, some of which are expected to be waived in the final (future) estimation, given the additional time investment we will procure. These assumptions are listed as follows:

1. In this pilot we assume that the CHE salaried lecturer/researcher file (UNLP) together with the student research file (SRF), comprises the universe of university researchers. In practice, we have reason to believe that a certain level of under-coverage exists, particularly among young *post-doctorate* fellows.
2. All R&D personnel are employed in full-time overall positions, even if their time, within these jobs, is not entirely devoted to R&D work. Excepting for student researchers we will qualify this assumptions in the future (final) estimation, with measures of total working hours per using existing time-use surveys²².

¹⁹ “Methodology for Estimation of Higher Education R&D Personnel” (1997). *Statistics Canada*. Publication # ST-97-13.

²⁰ We are investigating the possibility of collecting such information directly from higher education institutions in the future.

²¹ The Canadian census methodology uses the more detail SOC-80 scheme which has secretarial jobs sub-divided by fields of science. This contrasts with the SCO-94 occupational scheme used in the Israeli census.

²² Because both time-use surveys and the 2008 census all collected information on total (nominal) hours worked, it is possible to tabulate a separate table of coefficients expressing average overall job time. However, given the wide variation by job position in what is considered “full-time” it will be necessary to consult with experts (by field of science) to determine how final positions-time coefficients are to be measured.

3. While this pilot is limited to researchers in universities, we will also limit all Master's degree student researchers in the future, full estimation, to students in thesis tracks in university settings alone. The reason being, that with a few exceptions²³, non-university institutions are not characterized by internationally recognized research activity at the Master's degree level. We recognize that over time, as the academic colleges mature this situation may change, mandating a re-evaluation of our methodology accordingly.
4. We assume that student researchers (PhD, MA) engage in the *type* of research (basic, applied, experimental) in similar proportionate time shares as their non-student researcher peers²⁴. We adopt this simplifying assumption, based on the idea that students work on the same types of research projects as their faculty teachers. However, we recognize that this assumption should ideally be qualified through some form of empirical validation.
5. In this pilot we assume senior researchers and non-senior researcher show the same distribution of R&D time by type of research (basic, applied, experimental) since published (paper) coefficients were not available for non-senior group. In the full final estimation we can attain separate coefficients for this group from the PhD holder's survey micro-data files, which collected this information.
6. In this pilot, we uniformly impute coefficients of time devoted to R&D activities to three researcher sub-populations because of missing data. These values are derived from limited personal experience with Israeli higher education.
 - a. PhD students – 33%. The remaining two-thirds time is assumed to go into teaching and general learning tasks (not related to research).
 - b. MA students enrolled in thesis-track curriculums – 15%. The remaining 85% is assumed to go into teaching and general learning tasks (not related to research).
 - c. Non-senior (adjunct) PhD lecturers – 25%. The remaining 75% is assumed to go into teaching and general learning tasks (not related to research). In the future, full estimation, we expect to use real coefficient values from the (Career) of PhD holder's survey, which was unavailable in micro-data format for the pilot.
7. In this pilot we simplify and assume that the coefficients of time-use devoted to R&D (in general) as well as by type of research (in particular) show acceptable (low) levels of variation for grouped data. While we would naturally prefer to work with individual level data, such information is unavailable for 2012 (only for 2009) and is also partial, deriving from a sample survey. In the future full estimation we expect to consult with professional statistical methodologists (within the ICBS) to ensure that sampling errors from the time-use surveys are truly sufficiently small to ensure, statistical inference.
8. In this pilot we assume that all non-senior, non-student (mostly adjunct) lecturer staff are in fact researchers (see 5a above) and have attained a PhD educational qualification, even though we expect, especially in non-university settings that this may be need qualification. In the final full estimation we expect to complete missing educational attainment information for most of these cases by linkage to expansive educational attainment databases²⁵ in our possession. Any unlinked cases within the universities will nevertheless be imputed a PhD degree, while in non-university settings different (as of yet unknown) imputation strategies will have to be adopted.
9. We assume that the coefficients of time devoted to R&D activities (and by type of R&D) from both time-use surveys conducted in 2009 have not changed significantly over the short-term and remain valid for 2012. We acknowledge that over the

²³ Examples include specialized institutions such as the Rubin Academy of Music, Bezalel Art School, IDC, and Tel Hai Science College.

²⁴ We hold this assumption because as of now, we do not have data on student researcher R&D time-use, as the time-use surveys are restricted to PhD holders alone.

²⁵ It is nevertheless expected that we will not achieve full data coverage since an as of yet unknown percentage of Israeli researchers attained their PhD qualification abroad and /or at time periods before our coverage collection.

medium to long-term another survey will have to be conducted, based on FM recommendations.

10. We assume that the proportion of R&D researcher to non-research R&D staff, as collected in the 2008 Israel census, remain relatively static over the short to medium term, thus enabling us to make valid inferences (to 2012) for calculating non-researcher R&D personnel. We recognized that as time passes some form of methodological special treatment will be pertinent (e.g., interpolation between two censuses, as done by Statistics Canada).
11. We assume that R&D technicians and auxiliary support staff meet minimum educational qualifications, given the higher skilled nature of R&D work. These education thresholds are as follows:
 - a. Technicians – post-secondary qualification.
 - b. Auxiliary (secretarial) staff – Bachelor’s degree or higher.

8.5 Estimation

8.5.1 R&D researchers

8.5.1.1 R&D researcher headcounts

We begin by tabulating the number of *researchers* employed or studying in research degrees in the universities by sex, main field of science (other R&D non-researcher personnel are treated subsequently). Employees are sub-divided into two tables (A1 and A2) corresponding to senior and non-senior-non-student (e.g., adjunct faculty, post-doctorate fellows, visiting scholars, etc.) researcher personnel. These figures are derived directly from the file of university lecturer/researcher staff personnel file (see description in section 4.1). In order to ensure that there is no double counting between student researchers and non-senior researchers, we remove all records from this file that are commonly linked to the student enrollment files (described in section 4.3).

Faculty of Science	Total	Males	Females
Humanities	1,023	619	404
Social Science	1,177	724	453
Natural Science	1,849	1,361	488
Medicine	1,443	1,177	266
Agriculture	88	63	25
Engineering	587	502	85
Total	6,167	4,446	1,721

Faculty of Science	Total	Males	Females
Humanities	1,235	582	653
Social Science	2,090	1,103	987
Natural Science	770	506	264
Medicine	529	244	285
Agriculture	99	57	42
Engineering	1,471	1,050	421
Total	6,194	3,542	2,652

Next, we present headcounts of student researchers completing an advanced research degree (PhD., MA with thesis track) (in tables A3, A4 respectively). These figures are derived directly from our university student enrollment files described in section 4.3.

Faculty of Science	Total	Males	Females
Humanities	2,632	1,092	1,540
Social Science	1,964	780	1,184
Natural Science	4,072	2,164	1,908
Medicine	757	240	517
Agriculture	276	133	143
Engineering	911	275	636
Total	10,612	4,684	5,928

Faculty of Science	Total	Males	Females
Humanities	3,677	1,246	2,431
Social Science	3,146	1,066	2,080
Natural Science	3,344	1,813	1,531
Medicine	1,877	490	1,387
Agriculture	320	171	149
Engineering	1,865	1,360	505
Total	14,229	6,146	8,083

Assuming that the two files described earlier (i.e., UNLP & SRF) represent the universe of university researchers; we have completed our task, with regards to basic headcount estimation. However, in order to meet OECD publishing requirements we further our scope to include an additional analysis variable, educational qualification. This is accomplished by reorganizing the above tables, subsuming all cases under a two-level educational qualification hierarchy (PhD, other tertiary), using our previously defined assumptions and guidelines:

1. All non-student researchers have necessarily attained a PhD qualification since in order to receive funding, PhD degree is generally required.
2. Student researchers have naturally not attained a PhD qualification at the time of the estimation.

The result is the final table of researcher headcounts by education qualification (Table B1).

Table B1 - Total Headcounts for University Researcher						
by Educational Qualifications Level						
Faculty of Science	Total		Males		Females	
	PhD (T)	Other Tertiary	PhD	Other Tertiary	PhD	Other Tertiary
Humanities	2,258	6,309	1,201	2,338	1,057	3,971
Social Science	3,267	5,110	1,827	1,846	1,440	3,264
Natural Science	2,619	7,416	1,867	3,977	752	3,439
Medicine	1,972	2,634	1,421	730	551	1,904
Agriculture	187	596	120	304	67	292
Engineering	2,058	2,776	1,552	1,635	506	1,141
Total	12,361	24,841	7,988	10,830	4,373	14,011

8.5.1.2 R&D researcher FTEs

8.5.1.2.1 Coefficients for Researchers for FTE estimates

In order to measure R&D personnel in FTE terms we require data on the amount of time devoted directly to R&D activities from the total work time. Among university senior researchers this information was gathered in the time-use survey of senior researchers (see section 4.4 for description) and tabulated directly from an ICBS publication on the topic. Unfortunately, while it is possible to obtain this data for non-senior, non-student researchers directly from micro-data PhD holder in Israel survey, published tables were not produced at the time of this pilot. Instead it was incumbent upon us to impute an across-the-board value of 25% R&D time for this population group. This value is a crude estimate, given our expectation that this personnel group concurrently works in non HE settings. In the (future) full estimation, we expect to access this micro-data and calculate coefficients directly, after removing any possible duplicate records appearing in both (senior-staff, PhD holder) time-use surveys. Such direct tabulation will also enable production of coefficients by all the required analysis variables (e.g., sex).

Finally, we currently lack a means with which to measure R&D time outlays among student researchers. We recommend some form of student survey and/or consultation with department administrators in the future, but for now, we impute across-the-board values: 33% for PhD and 15% for MA students (see assumptions section 5.3). Results of R&D time-use coefficients are presented below in Table C1.

Faculty of Science	University Senior (C11)	University Non-Senior (C12)	PhD student (C13)	MA Student (C14)
Humanities	0.479	0.250	0.330	0.150
Social Science	0.482	0.250	0.330	0.150
Natural Science	0.486	0.250	0.330	0.150
Medicine	0.401	0.250	0.330	0.150
Agriculture	0.400	0.250	0.330	0.150
Engineering	0.412	0.250	0.330	0.150
Total	0.467	0.250	0.330	0.150

In addition to field of science, educational qualification and sex, the FM also recommends (but does not mandate) estimation by *type of research*. Given the fact that coefficients for this characteristic were collected and published by both time-use surveys, we are able to publish FTE estimates by the classification for all non-student researchers unproblematically²⁶ (see assumptions 4 and 5 in section 5.3). Table C2 below presents the R&D time-use coefficients among researchers by type of R&D.

Faculty of Science	Total	Basic research (C21)	Applied Research (C22)	Experimental Development (C23)
Humanities	1.0	0.778	0.165	0.057
Social Science	1.0	0.669	0.274	0.056
Natural Science	1.0	0.757	0.191	0.052
Medicine	1.0	0.537	0.327	0.136
Agriculture	1.0	0.577	0.330	0.093
Engineering	1.0	0.459	0.433	0.107
Total	1.0	0.682	0.247	0.07

In contrast to type of research, published coefficients results were not available when crossed with sex, so this factor is missing from the current work. Nevertheless, as stated earlier in the future full estimation re-calculating the coefficient table including sex will be feasible when the time-use survey micro-data will be accessible.

8.5.1.2.2 FTE researchers

In order to estimate FTE researchers we simply multiply cells of tables A1-A4 to the coefficients in table C1 taking care that cells correspond by analysis variables. Results are presented in tables D1 shown below. In order to clarify, table D1 is derived to multiplying the "Total" column of Tables A1 to A4 with columns C11 to C14, of Table C1, respectively.

Faculty of Science	Total	University Senior (D11)	University Non-Senior (D12)	PhD student (D13)	MA Student (D14)
Humanities	2,218.9	490.0	308.8	868.6	551.6
Social Science	2,209.8	567.3	522.5	648.1	471.9
Natural Science	2,936.5	898.6	192.5	1,343.8	501.6
Medicine	1,242.3	578.6	132.3	249.8	281.6
Agriculture	199.0	35.2	24.8	91.1	48.0
Engineering	1,190.0	241.8	367.8	300.6	279.8
Total	10,064.8	2,880.0	1,548.5	3,502.0	2,134.4

Estimation of FTEs by type of research for non-researchers and student researchers is more problematic because time-use surveys were not collected for these sub-populations (more on this in the discussion).

We continue estimating R&D FTEs by type of research, by crossing the results of table D1 with the table of coefficients C2 presented earlier and present the results below. To clarify, we multiply columns (D11-D14)*(C21-C23) to arrive at tables D21 to D24 respectively (and presented below).

Table D21 - FTE Researchers in Universities by Field of Science and Type of Researchers - Senior Researchers

Faculty of Science	Basic research	Applied Research	Experimental Development
Humanities	381.2	80.9	27.9
Social Science	379.5	155.4	31.8
Natural Science	680.3	171.6	46.7
Medicine	310.7	189.2	78.7
Agriculture	20.3	11.6	3.3
Engineering	111.0	104.7	25.9
Total	1,964.2	711.4	201.6

Table D22 - FTE Researchers in Universities by Field of Science and Type of Researchers - non-Senior Researchers

Faculty of Science	Basic research	Applied Research	Experimental Development
Humanities	240.2	50.9	17.6
Social Science	349.6	143.2	29.3
Natural Science	145.7	36.8	10.0
Medicine	71.0	43.2	18.0
Agriculture	14.3	8.2	2.3
Engineering	168.8	159.2	39.3
Total	1,056.1	382.5	108.4

Table D23 - FTE Researchers in Universities by Field of Science and Type of Researchers - PhD Student Researchers

Faculty of Science	Basic research	Applied Research	Experimental Development
Humanities	675.7	143.3	49.5
Social Science	433.6	177.6	36.3
Natural Science	1,017.2	256.7	69.9
Medicine	134.1	81.7	34.0
Agriculture	52.6	30.1	8.5
Engineering	138.0	130.2	32.2
Total	2,388.3	865.0	245.1

Table D24 - FTE Researchers in Universities by Field of Science and Type of Researchers - MA student Researchers

Faculty of Science	Basic research	Applied Research	Experimental Development
Humanities	429.1	91.0	31.4
Social Science	315.7	129.3	26.4
Natural Science	379.7	95.8	26.1
Medicine	151.2	92.1	38.3
Agriculture	27.7	15.8	4.5
Engineering	128.4	121.1	29.9
Total	1,455.6	527.2	149.4

Finally, as with headcounts we consolidate the four FTE tables into 2 tables defined by OECD educational level qualifications (PhD, and other tertiary level degree) by adding the relevant sub-categories together – senior and non-senior researchers (Tables D21 and D22 respectively) and keeping within-table, type of research columns fixed to produce the final FTE table for PhD researchers – Table D3. We treat non-PhDs in a similar fashion by summing up tables D23 and D24 together producing Table D4 for non-PhD. Finally, we add D3 and D4 for a total R&D researcher table by type of R&D research, shown in table D5.

Table D3 - FTE Researchers in Universities by Field of Science and Type of Researchers - PhD educational level				
Faculty of Science	Total	Basic research	Applied Research	Experimental Development
Humanities	798.8	621.4	131.8	45.5
Social Science	1,088.7	729.1	298.6	61.0
Natural Science	1,091.1	826.0	208.4	56.7
Medicine	710.9	381.7	232.5	96.7
Agriculture	60.0	34.6	19.8	5.6
Engineering	609.0	279.8	264.0	65.2
Total	4,424.1	3,020.2	1,093.8	310.0

Table D4 - FTE Researchers in Universities by Field of Science and Type of Researchers - Other tertiary educational level				
Faculty of Science	Total	Basic research	Applied Research	Experimental Development
Humanities	1,420.1	1,104.8	234.3	80.9
Social Science	1,118.9	749.3	306.9	62.7
Natural Science	1,845.4	1,396.9	352.5	96.0
Medicine	531.4	285.3	173.8	72.3
Agriculture	139.1	80.2	45.9	12.9
Engineering	579.8	266.4	251.3	62.1
Total	5,630.7	3,844.0	1,392.2	394.5

Table D5 - FTE Researchers in Universities by Field of Science and Type of Researchers - All Researchers				
Faculty of Science	Total	Basic research	Applied Research	Experimental Development
Humanities	2,218.9	1,726.3	366.1	126.5
Social Science	2,207.6	1,478.4	605.5	123.8
Natural Science	2,936.5	2,222.9	560.9	152.7
Medicine	1,242.3	667.1	406.2	168.9
Agriculture	199.0	114.8	65.7	18.5
Engineering	1,188.8	546.2	515.3	127.3
Total	10,054.7	6,864.2	2,486.0	704.5

8.5.2 R&D non-researcher personnel (technicians and auxiliary staff)

The following section describes in detail the estimation of R&D non-research personnel headcounts. This overall methodology is described specifically as follows (in order):

1. Filter in all 2008 Census records who are *salaried* employees in Israeli universities – Standard Classification of Economic Activities 1993, economic branch code 805.
2. Re-classify all cases in (1) into three distinct groupings – researchers, technicians, auxiliary staff by field of science using the following guidelines:
 - a. Researchers – all records who attained a PhD degree and who also work as lectures (occupational codes 071-077) or “hard” scientists (OC 00-05) working in the classic science fields.
 - b. Technicians – all records who attained an MA degree and who also work as lectures (occupational codes 071-077) or “hard” scientists (OC 00-05). We take this strategy because it is not possible to work as a researcher, independently without a PhD degree, and surmise that these employees work as research assistants often understood interchangeably as technicians within the common parlance of subjective census enumeration. In addition, we also include records who enumerated as “technicians” (OC 10-13) if they have at least a post-secondary educational degree.
 - c. Auxiliary staff – all cases employed in secretarial/clerical occupations (OC 31, 33, 37) that hold a BA²⁷ or MA degree. In addition, we include electricians (OC 64) with at least a post-secondary degree, likely to be employed in R&D work in “hard” science departments.

²⁷ We assume that R&D support tasks require additional skill levels and therefore do not include secretarial work with less than a BA degree.

3. Technicians and researcher R&D personnel cases are then assigned in respective fields of science in accordance with their occupational/scientific specificity, as summarized in Table E1 and elaborated subsequently.

Table E1 - Classification Coding Table for R&D Resesarchers and Technicians in Universities

Faculty of Science and SCO-94 Occupation Code Groupings	Highest Educational Degree Attained			
	Post-Secondary School	Bachelor's Degree	Master's Degree	PhD. Degree
Humanities - 076,077	-	-	Technician	Researcher
Social Sciences - 074,075,04,05	-	-	Technician	Researcher
Natural Science - 070,071,00,01,0X,10,13,64	Technician (among OC 10,13,64 alone)	Technician ☒	Technician	Researcher
Medicine - 073,03,14,15	Technician (among OC 14-15 alone)	Technician ☒	Technician	Researcher
Agriculture - 50, 51, 52, 126	Technician (among OC 126 alone)	Technician	Technician	Researcher
Engineering - 072,02,2X,11,12	Technician (among OC 11-12 alone)	Technician	Technician	Researcher

This table generally follows the Canadian methodology discussed earlier which defines researchers differently for estimating non-researchers when compared to researchers in their own right (as was done in section 6.1). To wit, we recognize only PhD holders as researchers with others²⁸, holding an MA (and BA in the “hard” sciences) assigned to technician job roles. We do not include PhD *practitioners* from Humanities (06, 08, 09 - e.g., artists/musicians, educators and Rabbis) because these roles are not directly oriented toward research.

Furthermore, in keeping with FM recommendations we do not count university employees in occupations not directly linked to research (e.g., building maintenance, guarding, duties, etc.), specifically performing education jobs (code 08) or aimed at a general university context (e.g., librarian clerks, code 35).

4. Assign secretarial auxiliary support staff (OC codes field of science 31, 33, 37) a field of science value based on relative weight each field of science expends on R&D overhead as captured by the administrative file of R&D expenditures in Israeli universities in 2008/9²⁹. Table E2 below presents these coefficients (shaded in grey) which are then multiplied by the total number of R&D auxiliary staff arrived at in section 3 above.

²⁸ We realize that non-PhD technicians are probably also researchers (under a student capacity), but do include them as researchers because we believe that researcher counts would be over-inflated. We propose in the future to further refine this grouping by adjusting results to the ratio of MA- thesis-track student + PhD to Master’s degree non-research.

²⁹ See ICBS publication No. 1552 - *Expenditures for Separately Funded Research at the Universities 2006/07-2008/9*. “Table 5: Expenditures for Separately Funded Research by Field of Research and Type of Expenditure.” Page 46.

Table E2: R&D Expenditures for Separately Funded Research by Field of Research and Type of Expenditure Expenditures in Israeli

In absolute figures:			
Field of Science	Other Expenditure	Overhead	Manpower
Humanities	38,578	7,581	83,254
Social Science	39,788	8,375	66,647
Natural Science	55,440	11,927	64,414
Medicine	345,093	80,329	396,515
Agriculture	17,175	5,619	27,530
Engineering	89,989	24,120	132,554
Other	18,292	467	8,005
Total	604,355	138,418	778,919
In coefficients:			
Field of Science	Other Expenditure	Overhead	Manpower
Humanities	0.0638	0.0548	0.1069
Social Science	0.0658	0.0605	0.0856
Natural Science	0.5710	0.5803	0.5091
Medicine	0.0917	0.0862	0.0827
Agriculture	0.0284	0.0406	0.0353
Engineering	0.1489	0.1743	0.1702
Other	0.0303	0.0034	0.0103
Total	1.0000	1.0000	1.0000

5. Recreate a table of table of R&D personnel headcounts based on the 2008 Israeli census shown below.

Table E3: R&D Headcount Personnel Counts Based on 2008 Census in Universities according to Table E1 category groupings			
Field of Science	R&D Headcount Personnel Estimates from the 2008 Israeli Census		
	Researchers (A)	Technicians (B)	Auxiliary Staff ^A (C)
Humanities	1,610	910	125
Social Science	1,160	540	138
Natural Science	2,960	2,990	1,331
Medicine	420	500	196
Agriculture	88	100	93
Engineering	770	690	397
Total	7,008	5,730	2,280

A. Auxiliary staff was distributed across fields of science based on the relative share of R&D overhead expenditures spent by each field in 2008/9.

6. Transform the counts table E3 above to a table of ratios measuring technicians to researchers (columns B/A) and auxiliary staff to researchers (columns C/A). The resulting Table E4 appears below.

Field of Science	R&D Personnel based on the 2008 Israeli Census		
	Researchers (R)	Technicians (A)	Auxiliary Staff (B)
Humanities	1.000	0.565	0.078
Social Science	1.000	0.466	0.119
Natural Science	1.000	1.010	0.450
Medicine	1.000	1.190	0.468
Agriculture	1.000	1.136	1.052
Engineering	1.000	0.896	0.516
Total	1.000	0.818	0.325

A. Based on methodology outlined in sections 5.2.2 and 6.2 of this paper.

The total population results estimate that there are 0.818 technicians and 0.325 auxiliary staff for every researcher, although significant variations are found when observing by faculty of science (as expected, faculties in the “hard” sciences are concentrated with technicians).

In order to evaluate this result we compare the personnel type ratios estimated above with those calculated by Statistics Canada (for 1995), assuming that the relationships between types of R&D personnel are relatively fixed. The results indicate that the ratio of R&D technician to researcher is generally consistent in the hard sciences (e.g., 1.24 in Canada, versus 1.2 for medicine and 1.01 in natural science in Israel). Other fields of science show greater discrepancies, however this may be due to diverging definitions, changing contextual settings (1996 versus 2008), and the different methodological approach taken for the auxiliary staff (see discussion section for more on this topic).

7. Calculation of final non-researcher R&D personnel headcounts.

8.5.2.1.1 Headcounts of Non-researcher R&D personnel

In the final procedure we apply the ratios in Table E4 to the final headcount estimates of researchers holding a PhD presented in B1 (column T). In other words we substitute the figures in column T from Table B1 into column R in table E4 and then multiply the respective coefficients in columns (A -technicians) and (B - auxiliary staff) by the newly revised column R, keeping field of science constant. The result is the final table E5 presented below.

Faculty of Science	Type of R&D personnel (headcounts)			
	Total	Researchers	Technicians	Auxiliary Staff
Humanities	3,709	2,258	1,276	175
Social Science	5,176	3,267	1,521	389
Natural Science	6,442	2,619	2,646	1,178
Medicine	5,242	1,972	2,348	922
Agriculture	596	187	213	197
Engineering	4,964	2,058	1,844	1,062
Total	26,489	12,361	10,107	4,022

We do not take into account researchers without a PhD when estimating non-researcher R&D personnel. This is because we assume that most non-PhD researchers (i.e., doctorate and master's degree students in a thesis track) do not employ additional technicians and auxiliary staff for their work but instead perform these jobs primarily by themselves. Hence, we ignore "other tertiary education researchers listed in table B1. Similarly, we do not estimate R&D non-researcher personnel *by sex* in this pilot because we did not estimate a separate ratio table of R&D personnel type by sex. Nevertheless, like FTEs among researchers this is entirely feasible in the future if we aggregate our ratio table by sex from the primary micro-data 2008 census file.

8.5.2.1.2 FTE of Non-researcher R&D personnel

While we recognize the requirements mandating estimation of non-researcher R&D personnel in FTE terms, we do not attempt such an endeavor at this time juncture. This is because we require access to the 2008 census micro-level (sample enumeration) file in order to calculate a new table of time-use coefficients, which was not available for this pilot. Nevertheless, we believe such an estimate might be possible, although not free of problems.

The methodology employed would be similar to the one employed for headcounts, using the 2008 census to create a table of ratios. However, before calculating these ratios, we would have to adjust the headcounts with a new table of time-use coefficients, indicating portion of time employed in relation to a full work-week³⁰ as a proxy for time in R&D. Then we would continue in similar fashion (creating a table of ratios which themselves are multiplied by the final table of research FTEs in Table D3).

The main problem with this approach is that our lack of direct measures on time-spent on direct R&D work in the census, do not easily allow us to assume that total work time per week is equitable with total time spent on direct R&D work. As we know from the FTE estimation conducted earlier, particularly among researchers, this assumption is unrealistic and is likely to result in an over-estimation of FTE researchers, and by default also non-researcher R&D personnel FTEs. In the discussion section below we review another possible solution to our non-researcher R&D FTE personnel problem.

8.6 Discussion

This pilot had as its principal aim the practical implementation of some form internationally accepted methodology that counts HERD headcounts and FTEs, as mandated by the OECD. Towards this aim, we adapted the workings of a Statistics Canada example from the late 1990s, which appeared to conform to most of our data capabilities. Namely, we combined a general payroll administrative data file with a time-use survey to derive many but not all of our required data outputs. In our view, the results of this pilot were very successful. In particular we:

1. Located an appropriate estimation methodology.
2. Applied this methodology with all its intricacies in a real-world setting.
3. Gained very valuable experience in both estimation and documentation of results.

Nevertheless, this pilot also brought to our attention other issues that need addressing, some known beforehand, if we are to develop national statistics on HERD in compliance with international standards. These issues include the following points we need to consider:

1. Application of methodology in non-university (i.e., academic college) settings – we envision this task much the same as in the university settings, but here we substitute the PhD holder's career survey as our source for R&D time-use coefficients (instead of the University Lecturer's survey). An issue to be determined is sampling errors which are likely to be larger in the PhD holder's survey, as the sample size among the subset of R&D researchers only working in non-university settings is much smaller when

³⁰ Tabulating the census variable: weekly hours worked (last week) in relation to a full work-week (i.e., 42.5 hours).

compared to the university lecturer's survey (used exclusively for university HERD estimation).

2. Data quality levels should ideally be evaluated in some fashion with regards to aggregation error levels. One idea that may be attempted is to run a simulation using 2009 as the reference year for *both individual* and aggregated levels of analysis. To wit, since 2009 is the collection year of both time-use surveys, it may be feasible to estimate HERD directly from these surveys (in conjunction with 2009 administrative files). Thereafter, a regular, aggregate-level estimation, used for the other years could be conducted; in order to compare and measure results from both estimation methods.
3. This pilot brought awareness to the potential pitfalls of double-counting. In particular, we discovered a problem with *student researchers* who are in many cases likely to be conducting supporting roles in their own in addition to other (i.e., lecturer's) researchers. At this stage it was impossible to separate these combined roles, however if we could obtain additional information from the HE institutions on the levels of this phenomenon (even of a general nature) we could find ways to adjust our estimates accordingly. This may be of use also for improving estimates for non-researcher R&D personnel (see below).
4. A methodological improvement should to be developed to better estimate R&D non-research personnel for a number of reasons including:
 - Reliance on the Canadian methodology based on the census appears somewhat problematic from a data quality perspective. This data source, while meeting our core estimation needs appears risky, given that the census (as opposed to administrative files), lacks proper quality control oversight. In particular, the responses are derived from 20% long-form sample enumeration in which questionnaires are filled out by proxy (one per household) and may suffer from under/over coverage errors. In addition, economic branch and occupation coding processes are determined manually, by ICBS interpreting coders, further introducing errors to this end-product.
 - As opposed to the Canadian method, auxiliary personnel working in R&D are not sub-coded by fields of science. Our adjustment strategies, attempting to further adjust aggregates based on external HERD funding levels, may not be sufficiently accurate for our needs.
 - The Canadian methodological procedure of interpolating the coefficients between two censuses in order to estimate annual non-researcher R&D personnel on annual basis appears similarly precarious, stretching the data quality capabilities of this data source even further.
5. In order to improve on the Canadian method for estimating non-researcher R&D personnel we envision the following possible solutions:
 - The ideal solution is to expand administrative data source data collection to include for this personnel sub-group in particular. This information is in fact available and may be collected (at this stage only from universities only). The main problem here is that the definitions are murky on whether this personnel sub-type is specifically engaged in R&D support activities. Nevertheless, once we obtained this sub-population data set for the ICBS, we may be able to further adjust these base figures and still be on firmer ground, when compared to reliance on the Canadian estimation methodology.
 - An additional possible solution to the imprecise estimation method encountered is to collect new aggregate coefficient data, at the field of science level, directly from the HE institutions themselves. To wit, if information on the ratio of R&D research to R&D non-research can be gleaned at the HE department level we could use this information to adjust administrative data. Such a data collection, while not without its difficulties, may be feasible if done at the aggregate level. Furthermore, since we do not envision large-scale changes to occur over the short-term, such a field enumeration could be limited to broader time intervals (e.g., every five years).

- A final possible improvement on the current estimation may be undertaken by adjusting ratio coefficients based on additional case studies conducted outside of Israel. That is, additional international experiences measuring the ratio of R&D researcher to non-research R&D personnel may be brought both in a evaluative capacity and maybe as way to adjust our own coefficients, at least for mitigating large-scale aberrations discovered in our data.

In light of the above we hope to continue learning this topic including through the conduction of an additional pilot, embracing more complete data, especially the academic colleges. For such an endeavor we require the full, micro-level input data files which were missing for the pilot for more precise estimation.

We would also value additional, external independent critical review of our work. Such exposure is vital and may be advanced via formal presentation of our work in ICBS steering committee panels and/or participation in the OECD HERD working group. In any case, we believe that our work presented in this paper, marks a tremendous improvement on past ICBS data dissemination to the OECD on HERD personnel estimation. We hope that after conducting a full estimation, a revision of ICBS HERD measurement can be achieved.

Finally, at this time we would like to extend our appreciation toward the Twinning Project organizers who provided the framework for this project's advancement and in particular toward our Danish partners for their methodological assistance and cordial relations both in Israel and in our study visit to Denmark.

8.7 Annex

Table of Field of Science Aggregation

1. NATURAL SCIENCES
1.1 Mathematics
1.2 Computer and information sciences
1.3 Physical sciences
1.4 Chemical sciences
1.5 Earth and related environmental sciences
1.6 Biological sciences
1.7 Other natural sciences
2. ENGINEERING AND TECHNOLOGY
2.1 Civil engineering
2.2 Electrical engineering, electronic engineering, information er
2.3 Mechanical engineering
2.4 Chemical engineering
2.5 Materials engineering
2.6 Medical engineering
2.7 Environmental engineering
2.8 Environmental biotechnology
2.9 Industrial Biotechnology
2.10 Nano-technology
2.11 Other engineering and technologies
3. MEDICAL AND HEALTH SCIENCES
3.1 Basic medicine
3.2 Clinical medicine
3.3 Health sciences
3.4 Health biotechnology
3.5 Other medical sciences
4. AGRICULTURAL SCIENCES
4.1 Agriculture, forestry, and fisheries
4.2 Animal and dairy science
4.3 Veterinary science
4.4 Agricultural biotechnology
4.5 Other agricultural sciences
<i>SUB-TOTAL NSE</i>
5. SOCIAL SCIENCES
5.1 Psychology
5.2 Economics and business
5.3 Educational sciences
5.4 Sociology
5.5 Law
5.6 Political Science
5.7 Social and economic geography
5.8 Media and communications
5.9 Other social sciences
6. HUMANITIES
6.1 History and archaeology
6.2 Languages and literature
6.3 Philosophy, ethics and religion
6.4 Art (arts, history of arts, performing arts, music)
6.5 Other humanities
<i>SUB-TOTAL SSH</i>
NOT ELSEWHERE CLASSIFIED

MR12 - Twinning activities B.6

Component: Education Statistics

Sub-component: Culture and Sports Statistics

MR12: Plan identifying indicators on culture and sports

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List of Abbreviations

BC	Beneficiary Country (Israel)
ICBS	Central Bureau of Statistics (Israel)
MS	Member State

1 Summary description of the Twinning activities

During the B.6 mission, ICBS presented their current statistics on culture, including the economic aspect as part of the national accounts Satellite Accounts on Culture. Also the developing plans and ideas for the culture statistics of ICBS were presented which provided a good basis for the discussions and the concrete planning of future initiatives.

The MS Expert presented the actual statistics on culture in Statistics Denmark with a focus on the use of different classifications and nomenclatures. The idea is that information, or statistics, on culture may be derived through already existing registers based upon the well-defined categories of economic activities (ISIC or the EU equivalent, NACE) or occupations (ISCO).

Both the UNESCO manual on culture statistics and the ESSnet-Culture report from Eurostat were presented, highlighting the two systems' slightly different approaches as regards the split into domains and functions. The reasons to these differences were discussed, and mostly they were thought to be unproblematic. The ESSnet can be seen as a pre-study to a coming EU regulation on the EU member states' reporting obligations, and therefore the ESSnet may be more operational as compared to the more "theoretical" UNESCO system.

Still, both the UNESCO and the ESSnet systems should merely be seen as a possible way for the statistical producers to create an internal overview. That being said, Statistics Denmark's way of disseminating the culture statistics is to some extent related to the ESSnet methodology.

Users of the statistics from the Knesset, the National Library and the Ministry of Culture took part in the discussions during the first three days, thus providing valuable information on what could be useful additions to the already existing statistics on culture in Israel.

2 Background

The statistics of culture and sport at ICBS have seen great growth and development over the years, constantly finding new data sources and possible coverage areas. This growth has been recently guided by UNESCO's Framework on Culture Statistics, which has been used in ICBS to set the scope of what is to be covered by its statistics.

Still, given the reality of limited resources, there is a need to establish priorities among different projects. Not only that, UNESCO's framework seems to be a limited tool for actual data collection, as it does not include concrete implementation recommendations but is rather a complex, theoretical framework.

All of this set the background for the challenges that culture and sport statistics currently face at ICBS, in addition to the need to make this new collected data available to users in an effective way.

3 Conclusions and recommendations

The area of culture statistics is very comprehensive, and a very large number of statistics are suggested in the manuals and could be produced if only the data were available.

One general observation is that the current way of disseminating statistics does not meet users' needs. Statistics Denmark's www.statbank.dk is an example of a fully-fledged dissemination tool, allowing the user to overview all data available including historical data, choose and pick variables from the statistics the user is interested in, download in any format. The users present during the mission highly expressed their interest in having the data available through such a dissemination tool.

The users' specific wishes to statistics were both on completely new statistics, for example on music and music schools, and on supplementing existing statistics with the part of the area in question (music, theatre etc.) which functions without government support.

Breakdowns by funding, region (geography), gender, age, type of instrument for the active participants, and by paying vs. non-paying passive participants were mentioned as among the most interesting.

Like in Denmark, it is rather limited what statistics can be produced on sports. An ICBS initiative on violence in sports could result in rather interesting and relevant statistics.

Comparability in international perspective

For reasons of comparability, the ICBS addressed a need of ensuring that the culture statistics meets international requirements. It is the MS Expert's assessment that the culture statistics area in ICBS shows a good understanding of the elements in the UNESCO FCS 2009 system.

As mentioned below the success to provide a proper start point for performing international comparisons depends on the ability to use international standards and classifications systems.

4 Recommendations

The ESSnet-Culture 2012 report from Eurostat builds on the UNESCO framework, and can be seen as a pre-study to a possible EU Regulation on the member states' reporting obligations. As such, it may provide additional inspiration to ICBS as compared to UNESCO's framework document when developing new statistics, but it is not in all cases an operationalized (implementable) document.

The introduction of a general dissemination tool would highly facilitate the dissemination of statistics on Culture and Sports. Still, a mechanism to make the public (the users) aware of the increasing numbers of statistics on culture is needed – it is not enough just to put the data on the web. A separate booklet could serve this need, as could a series of press releases, each copy with a focus on its separate field.

General recommendations

NEW STATISTICS SHOULD TAKE RELEVANT CLASSIFICATIONS SYSTEMS INTO ACCOUNT

In the work towards new culture statistics, it is recommended that ICBS in each case seeks inspiration in the Eurostat ESSnet Culture report as this may provide a range of usable suggestions which may be rather easy to adopt. In that case ICBS can ensure a high degree of comparability regarding international statistics from UNESCO as well as Eurostat or other international organizations.

ONGOING DEVELOPMENT OF DATA GATHERING

In general the ICBS was recommended to consider possibilities for gathering data from any kind of stakeholders who may be in a situation of either collecting or receiving data. Data gathering should be taken into account when establishing new statistics as well as substitute existing data providers in an effort to reduce the use of resources. As an example the ICBS did mention, that data on museums and galleries may possibly be collected from PILAT. Furthermore it was also mentioned, that the Ministry of Culture would be interested to deliver data on libraries.

ESTABLISH CONTACT WITH USERS AND PROVIDERS OF CULTURE STATISTICS

It is in general recommended to keep contact and also establish contact to users of culture statistics as well as to data providers keeping in mind that those persons or institutions may have knowledge about what could be relevant, or possible, to develop and maintain, including the data collection. In best case the effect could be either a release of resources or an improvement of the existing data collection.

The ICBS colleagues were suggested to think and prioritize the documentation and use of metadata not least for the sake of future dynamic web-table dissemination.

Specific culture statistics areas recommended to develop

During the meetings in the ICBS four areas was discussed as potential subjects to develop.

- 1) Statistics on book releases
- 2) Music statistics
- 3) Violence in sports
- 4) Media statistics

Four areas of development were agreed upon during the mission:

1. Dissemination of already published statistics (mostly by the Ministry of Culture) only when a general, total-coverage dissemination tool for ICBS's electronic dissemination is established.
2. Develop existing statistics with supplementary variables and initiate new statistics based on data readily available either within ICBS or through its close partners
3. Define long-term development projects and approach the necessary and essential data providers and stakeholders in such statistics in order to agree on the content of new statistics and the planning of its development
4. Prepare for the foreseen 2017 time use survey in households with respect to formulation of specific culture-related questions to be included in survey, preferably to be based on the ICATUS classification/manual.

5 Implementation of the mandatory results

5.1 Co-operation with National Library, ACCUM and others

By December 2014:

- Complete the agreements with respect to the on-going talks between ACCUM and the National Library in order to get arrangements with respect to future data exchange formalized.

Prioritizing the indicators

For the period 2015-2016:

- Develop methodologies and publish new data on the following topics:
 - Sport: Violence in competition sports (5 specific ball games already identified)
 - Books and Press: Add translated titles to the existing book statistics (based on data from the National Library)
 - Music: Different breakdowns of the composers, their income (including supplementary income arising from work not related to music), geography, Hebrew vs non-Hebrew etc., based on ACCUM data
 - Cinema: data on festival from PILAT published
- Prioritize among the possible long-term development projects based on data availability studies and users' demand for the statistics in question, for example:
 - Library statistics (continuation of 2010 data deliverances to ICBS)
 - Broadcasting/media statistics
 - Cross-cutting split of subsidized vs. non-subsidized culture activities, e.g. examine the data availability at the local authorities, artist organisations

- Develop culture-related questions to the planned 2017 time use survey
 - Involve relevant departments of ICBS
 - Involve external stakeholders, including representatives from the Sports Agency within the Ministry of Culture

2017 and beyond:

- Implement the time use survey
- Continue cooperation with stakeholders (users as well as data suppliers) in order to further develop the area of Culture and Sports statistics

5.3 Presentation of detailed plan towards publishing the results

A draft plan for the development of the Israeli culture statistics, including a preliminary time horizon, is to be ready by December 2014 and made available for other stakeholders' comments. The plan includes:

- Possible new indicators
- Short description of methodologies
- Possible data suppliers, at micro-level whenever available

6 Impact

The Twinning activity carried out in ICBS on culture and sports statistics has led to the preparation of a work plan for compilation of statistics and indicators in this area, and therefore it has clearly fulfilled the purpose of the project.

The interactions and exchanges during this activity generated a dynamic of its own, thus finding new areas for statistics development beyond the agreed upon initial work plan. Some of these additional topics which were brought up, and may become object of future statistics once resources are found so they can be prioritized: People employed in cultural occupations (from surveys such as LFS), book publishers. The latter seems to be of growing importance to those involved in this industry and the general public, in light of new legislation recently enforced, and initial classifications of publishers by size have begun together with the National Library. Talks have begun to involve contacts at the Ministry of Economy so as to have a tripartite project with the National Library.

A third topic initiated through informal conversation during this activity was enhanced cooperation with the Sports Directorate at the Ministry of Culture and Sports. Their initial interest in developing sports statistics has generated talks at a higher level (a significant meeting with the Head of the Directorate was held in February 2015).

7 Follow-up and sustainability

The development of culture and sports statistics depends heavily on sustained cooperation with external data suppliers and data users. The contacts that have been established during this activity have been further developed into long-run commitment and projects.

Such a process has been initiated with ACCUM on music data (see further detail in the Development Plan on Annex 1): During 2014 initial contacts were initiated. An official request for obtaining administrative microdata was sent by ICBS. The legal advisors of both ACCUM and ICBS made contact, and an additional meeting in March 2015 was appointed in order to agree on the data format to be transferred. The approved transfer contract is to be valid for a 5-year period, so ensuring the long-term scope of the project development.

The exchanges and cooperation with the National Library on book and press statistics are based on a long-term agreement signed by the Government Statistician and the National Library's General Manager on June 2009 (see Annex 2³¹).

In addition, the development of the Violence in Sports indicator is well underway, as the preliminary findings are already part of the current quarter (January-March) work programme submitted to top management. This quarter's work programme also includes creation of the statistical file on books for 2013, which has already been received from the National Library, and also includes identified data on translated books.

Development of statistics on Cinema and festivals is to be included in the ICBS work programmes for the 3rd and 4th quarters of 2015.

8 Development plan

Introduction

This document presents in detail the implementation plan following the recommendations issued during the B6 Twinning Activity on culture and sports statistics in ICBS. The core of this document are the development areas in culture statistics indicated during the aforementioned activity to be in high priority, specifically for intended development during the years 2015-2016.

This plan includes a list of statistics and indicators on this topic, as well as a preliminary time horizon for the development of each, methodologies, description of the data and identification of data suppliers. Each area description shall also include the actual steps already adopted towards fulfilling the statistical goals as well as pending issues and challenges still needing to be solved. Therefore, not only does this document describe intentions, but also the current status of development for each indicator. Each of these indicators shall be described in a separate chapter henceforth.

Music statistics

The intended work in this area is to produce different breakdowns of the composers, their income (including supplementary income arising from work not related to music), geography, Hebrew vs non-Hebrew etc., based on ACCUM data.

The immediate recommendations issued in this area were as follows:

Complete the agreements with respect to the on-going talks with ACCUM in order to get arrangements with respect to the future data exchange organized.

During 2014 initial contacts were initiated with ACCUM, the Authors and Composers Association, which resulted in a preliminary list of the variables that ICBS would receive. An official request for obtaining these administrative microdata was sent by ICBS. After the legal advisors of both ACCUM and ICBS made contact, it was agreed that the initial request was too wide and general, and they agreed to appoint an additional meeting in March 2015 in order to agree on a narrower variable list to be transferred.

The Violence in Sports indicator

This project aims at describing the level of existing violence in competition sports, specifically the most popular ball games, and account for trends in this area.

The immediate recommendations issued in this area were as follows:

Develop methodologies and publish new data on the following topics:

- Sport: Violence in competition sports (5 specific ball games already identified)

³¹ Scanned document in Hebrew.

It has been planned to obtain microdata from the top five ball sports. After initial contacts were established, it has been agreed to begin by the collection of three microdata files, one file thereof (basketball) requires payment, and the other two are to be obtained for no charge. Specific resources have been allocated in ICBS's annual budget so as to ensure the annual purchase of the basketball file.

The development of the violence in sports indicator has been included in the current work programme document for the Education Statistics Sector for the first quarter of 2015, with the goal of having a finalised document with the preliminary indicator ready by the end of the quarter.

By February 2015, relevant data files have been received from the three federations (football, basketball and volleyball). These data describe the misconduct events which are not an integral part of the game, and have been sanctioned by the respective federation's disciplinary court. In addition, ICBS received detailed data on the matches played for each league, so as to calculate the indicator by basically dividing the number of misconduct events by the number of matches played for each league. A draft analytical paper with preliminary results was prepared by February 2015. Once it's finalised and approved, it is planned to have it disseminated as an ICBS press release, probably by the end of May 2015.

The work programme for the second quarter of 2015 is to include a final version of the paper (on three branches) and the aforementioned press release. Future development shall include the goal of expanding coverage to two additional ball games (water-polo and handball). Initial talks have begun with representatives of both federations.

Books statistics

Statistics on published book titles, by various breakdowns, have been annually produced and published by ICBS for several years. The immediate recommendations issued in this area were as follows:

Develop methodologies and publish new data on the following topics:

- Books and Press: Add translated titles to the existing book statistics (based on data from the National Library)

The data file on titles published in 2013 was delivered by the National Library on February 2015. This file includes primary data identifying books which are translations (either to or from Hebrew). These data includes only translations made in Israel.

During 2015 these new data shall be analysed in ICBS, and in case it is found to be of publishable quality we shall move forward to designing the final format for its publication (e.g. as part of existing tables or a new, standalone annual table) in 2016.

Cinema statistics

Current statistics on cinemas are collected from the Federation of Movie Theatres and an annual survey of cinemateques, while data on movies shown are collected from the Ministry of Culture's Movie Inspection Council. According to the UNESCO classification of culture activities, an additional relevant area that could be covered is movie festivals, which can also be a relatively easy addition in terms of required resources.

The immediate recommendations issued in this area were as follows:

Develop methodologies and publish new data on the following topics:

- Cinema: data on festival from PILAT published

Data collected by PILAT for the Ministry of Culture is the sort of "low-hanging fruit" statistics, in which a ready-made statistical table, built by an external body, may be integrated into ICBS statistics and fill a gap in statistical coverage. This use of data is very cost-effective, as opposed to initiating a new ICBS survey or data collection. But it is important to remember that this is only data on publicly funded festivals, and therefore it does not necessarily present a whole picture. Not only that, the State Comptroller has criticized in the past ICBS's practice of using these ready-made statistics, which were neither collected nor professionally scrutinized by ICBS's experts, and therefore ICBS cannot guarantee its statistical quality.

For these reasons, the use of these data is conditional upon the ICBS management's authorization, after considering availability and data quality issues. Such a decision may also reflect on similar culture statistics provided by PILAT, such as dance ensembles, theatres, orchestras, exhibition spaces, etc, which may be also used for official statistics for the same reasons of availability. These data are important and worth publishing since they reflect the use of public funds, but for this very reason they are limited in scope. For each of these areas, complementary surveys could be implemented for collecting non-funded cultural activities, as is currently done in the area of museums.

A proposal on using PILAT data is to be presented to ICBS management during the second quarter of 2015. Further development in this area is conditional on decisions to be adopted in this respect.

Cooperation agreement between ICBS and the National Library (scanned document in Hebrew)

MR13-15 - Twinning activities C.1, C.2, C.3, C.4, C.5 and C.6

Component: Strategic Planning and National Statistical System

MR13: Establishment of a long-term strategic plan for Israeli official statistics.

MR14: Establishment of a system and procedures for long and short term planning.

MR15: Enhancement of ICBS engagement in the NSS

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List of Abbreviations

BC	Beneficiary Country (Israel)
CoP	European Statistical Code of Practice
DQAF	Data Quality Assessment Framework
GSBPM	General Statistical Business Process Model
ICBS	Israel Central Bureau of Statistics
MS	Member State
NII	National Insurance Institute
NSI	National Statistical Institute
NSS	National Statistical System
PCS	Public Council for Statistics
SDDS	System of Data Dissemination Standards
SDK	Statistics Denmark
SDMX	Standard for Data and Metadata Exchange
QAF	Quality Assessment Framework

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1. Summary description of the Twinning activities

Component C activities addressed several topics:

- 1.1 **Strategic planning** – addressed in two MS expert missions to ICBS and in a study visit to Statistics Denmark;
- 1.2 **Procedures for long term and short term planning** – addressed in one of the MS expert mission.
- 1.3 **Specific strategies** were elaborated: Dissemination strategy – addressed in two missions, which will be reported in the final report of component E; and a metadata strategy – addressed in two missions, introduced to component E). Specific strategic issues were also addressed in other components of the project.
- 1.4 **Coordination of the National Statistics System** – addressed in two MS expert missions regarding the relations within the NSS and one mission on the coordination with users and data providers.

Since Component C is dealing with critical, cross-sectional challenges of an NSI and of an NSS, related issues not pre-planned, like quality and metadata, became an integral part of Component C and the activities were geared to address them as well.

1.1 Strategic Planning

Activities C.1 and C1.1

The objectives of the first mission and its follow-up in Component C, were:

- to identify missions, visions and objectives for the long term strategy
- to put together recommendations for development of quality frameworks, strategic planning and its' monitoring.

Topics discussed, among others: The current ICBS vision, mission and principles, definition and future of official statistics (incl. a Danish survey among European NSIs), quality assessment and quality management, monitoring strategy, SDK strategy, the European Code of Practice. Special attention was devoted to meeting the needs of users, suppliers and producers and to the culture of continuous improvement. See Activity Report.

Study visit C.2

The study visit to Denmark aimed to expose the Israeli senior directors of ICBS and of the Bank of Israel to the experience accumulated in Statistics Denmark, when dealing with different aspects of strategic planning.

Senior directors of Statistics Denmark presented the implication of implementing the strategic plan as a process of change. Integrated crucial parts of the process are the ongoing quality control and the reporting of metadata, including the quality of the end products.

The need for cooperation with the partners in the NSS is shared by both offices, and so is the centrality of the Central Bank. A visit to the Danish National Bank helped to the understanding of possible mechanisms to be operated in a mutual dependence situation.

The Danish dissemination strategy and implementation, including the relations with the users, and the way micro-data is made accessible to researchers, were found feasible to serve as an example for the development of ICBS website and micro-data accessibility.

1.2 Procedures for long term and short term planning

Activity C.5

This activity was devoted to improving the strategic plan drafted after previous activities, and to refer to the procedures of updating it vis-à-vis the short term plan (Annex 2).

In addition, since it was one of the last activities, other issues were addressed in order to ensure understanding and match expectations regarding what has to be done regarding setting up a macro database based on cubes, micro data access, and coordination of the NSS. This activity was also used to meetings with component leaders and touching base before the end of the twinning project.

Some principles on long and short term planning were identified (See Activity Report).

1.3 Specific Strategies

Activity E6.2

The content of this activity was added to the project when realizing that it is an infrastructure issue that need to be addressed as part of the strategy. The objectives of the activity were:

- Development of a strategy for metadata and quality.
- Discussions of ICBS' specific need regarding choice of data formats and corresponding software solutions for a central metadata system.

Using Colectica software, the importance, advantages and fonctionnalités for internal and external use, of an integrated statistical metadata system (SMS) was demonstrated.

Live demonstration of the SMS software functionalities was used to:

- build metadata for a simple questionnaire with reuse of code lists and variables
- build metadata for a simple data-structure (micro-data from survey/administrative data)
- build an aggregated dataset using N-cube, with reuse of micro-level variables and code lists.
- support the work on quality declarations with reuse of statistical concepts and as a part of adopted GSBPM processes.

Discussion was also referring to the importance of DDI based documentation, the relations between SDMX and DDI, the risks in using the only commercial application of DDI, and alternatives and costs. Software permissions could be used to enforce centralised standardization and harmonization of concepts, variables etc.

A maturity model was presented to describe the short, middle and long term perspectives of a metadata driven statistical production. Recommendations on methodology, processes, metadata strategy and quality were formulated, and the roadmap drafted in Activity E4.1 was improved.

Activity E4.1

This activity came to further deepen the understanding of the need of an integrated and centralized metadata system and of the planning stages.

The objectives were:

- to introduce ICBS staff to the methodology of building a metadata system; *and*
- to define a work plan and milestones for the development of a metadata system for ICBS.

Quality and metadata are overarching frameworks, being connected to all inputs-processes-outputs, including management.

The overall methodology proposed was the Business Process Management, focusing on the "as-is" and "to-be" positions, with each sub-process examined for its contribution to the value of the final product delivered to the user/customer. By BPM, metadata should create a value chain for internal and external users and contribute to cost-effective production.

The current state with regard to metadata ("as-is") is twofold: the environment (legal, IT, users' needs, and standards) and the activities (current strategy, processes and technology).

Within the BPM framework, enterprise architecture methodology was proposed to decide on how to move from "stove pipes" to common processes, common metadata applications, and common dissemination applications where data and applications can be reused across the organization.

Five primary functions were chosen as ICBS goals for metadata as a result of a group discussion. A preliminary work-plan was agreed upon.

- Managing communication with end-users and getting users' feedback.
- Disseminating statistical information to end users with reliable metadata for searching, navigation, and interpretation of data.
- Improving the quality of statistical data and transparency of methodologies.
- Managing methodological activities, standardizing and documenting concept definitions and classifications.
- Managing, unifying and standardizing workflows and processes; Documenting processes.

1.4 Coordination of the NSS

Activity C.3

The objectives of the mission were:

- To discuss the role of ICBS in the National Statistical System (NSS) and the way to establish the NSS Coordination Committee;
- To present the new EU legislation on coordination of official statistics (Statistics law).

In preparation to the mission, ICBS started mapping NSS partners, statistical activities and statistical products.

In a one day seminar, ICBS raised the awareness of the NSS partners to them being part of what should function as one system. Common interests and further cooperation needs were identified. Experience of coordination in Denmark and in the EU was presented. 60 people in 41 partner institutions in the NSS attended the seminar, 12 institutions presented their work (See Activity Report).

There was a demand from all producers for more access to data, with better solutions to deal with confidentiality constraints. Furthermore there was a wish for expanding the cooperation between the local governments and ICBS. The NSS partners also expressed their wishes regarding future cooperation.

Different models and tools of coordination and cooperation were presented, including total centralization of the statistical production, adoption of common guidelines, adoption of common standards – central concepts, output standards or metadata standards, micro data sharing, common dissemination, common metadata portal and statistical branding by ICBS.

The Managers Forum conducted during the mission confirmed the good cooperation with NSS partners, which is less successful with suppliers of administrative data.

The seminar showed that besides an already good cooperation with ICBS, there was some demand for ICBS to serve as the statistical methodology expert and to promote common guidelines for national and international standards. The possibility of using the conceptual European quality framework in Israel was discussed.

Activity C.4

The objectives of the activity were to

- build users' focus groups of heavy users ("farmers") and of researchers ("miners") and to demonstrate a possible dynamic to elicit real feedback to existing information and to additional needs
- have a meeting and a seminar with administrative data providers.

The discussions in the users' focus groups revealed a high level of satisfaction with the metadata provided on ICBS' website and the service provided by ICBS when contacted by users. ICBS was acknowledged as a reliable information source and a trustworthy organization. However, a number of important areas for improvements were addressed (some of which related to metadata and some which related more to the statistics itself, as detailed in the Activity Report.

ICBS presented some of its plans to improve services: the 'Eckstein Committee 2', MoU's, the new website and the building of an integrated and centralized metadata system linked to the website.

The Government Statistician of Israel, Prof Danny Pfeffermann opened the data providers' seminar, followed by the EU Head of Delegation to Israel, Ambassador Lars Faaborg Andersen. The seminar brought together important data providers from public authorities and large private companies. The discussion addressed the data collection process and the statistical use of administrative data, including cooperation with owners of administrative data. ICBS presented principles and practice for data security and statistical disclosure control to guarantee the confidentiality of information on citizens and enterprises.

Different public authorities presented their statistical work to support policy and their dissemination to the public.

- They informed about their relations and cooperation with ICBS, including MoUs.
- They welcomed the twinning project as a facilitator between data providers and ICBS.
- They wondered about having systematic and standardized methods of data collection across the NSS.

The consultants presented their register based statistical system built on administrative data, including their data provider policy to ensure providers' cooperation, data validation in case of 'key accounts' - the largest private enterprises, and they also presented the improved service of SDK to the public, based on administrative data.

ICBS could have also improved both efficiency and quality of statistical information, if all relevant administrative data produced in other Government bodies could have been obtained by ICBS, and preferable, free of charge.

Activity C6

The purpose of this activity was to initiate new MoU's with two partners in the NSS – the National Insurance Institute and the Ministry of Finance.

The meetings with the two partner producers were very promising. A generic MoU was produced (Annex 3).

2. Background

2.1 Strategic Planning

"Strategic planning helps determine the direction and scope of an organization over the long term, matching its resources to its changing environment and, in particular, its markets, customers and clients, so as to meet stakeholder expectations". (Johnson and Scholes, 1993). It should be the basis of the annual planning and the frame for the decision of the next year's activities. Plans should be followed up in order to see if the goals have been achieved.

ICBS worked according to a medium-term plan (3-4 years) during the accession process to the OECD. A mission and vision statement was published on the internet. However, a long term strategy has not yet been developed.

ICBS has defined its vision and mission, and in the process, the employees were given the opportunity to give their inputs. However the vision and mission have not been used regularly in the planning of annual work programs and therefore not really adopted.

The objective of MR13 was therefore to activate a decisive work process with the top management in order to review the work already done, formulate a long term strategy, complement it in specific strategic areas, define long-term objectives and specific initiatives and set up internal processes to ensure use, acceptance and ownership by the whole staff.

2.2 Coordination of the National Statistical System (NSS)

ICBS is covering most subjects in statistics, but other institutions are also producers of statistics perceived as official. The Central Bank of Israel is one of the most important partner, and an MoU between the two organizations was signed in 2009. ICBS do not have the whole picture of the producers of official statistics in Israel – having a lot of cooperation in providing statistical input to ICBS, but less cooperation concerning the quality of statistics produced in other bodies. This lack of coordination has led to problems of efficiency in using the tax payer money, in confusing the users who get different information from different government agencies and also in reporting statistics to the international organizations.

Official statistics should be produced by an independent organization, using scientific methods based on international standards. Therefore, not all producers really produce Official Statistics in Israel. They should adopt internationally accepted standards, and as directed in the Statistical Ordinance, they should consult with the Government Statistician in any statistical operation they plan.

The Public Council for Statistics, representing both users and producers of statistics (50-70 members) is the formal place for this coordination and should be the vehicle for enhanced coordination of the NSS. At the beginning of the twinning project, it was not functioning well for over a year and had no Chairman, although subcommittees in specific statistical areas were very effective.

2.3 Efficiency and work processes

ICBS has about 650 employees and additional 400 interviewers in the surveys unit. Three features of the organizational chart were prominent:

- The representation of the subject matter statistical divisions in the organigram, is not reflecting its being the core business of ICBS ;
- 'Sister' statistics are performed in different parts of ICBS and
- Two units are very big: Surveys department and the IT department.

Improvement of the effectiveness of the organization should be one of the important subjects in a strategy, and therefore some objectives should concern work processes in the institution. In order to achieve standardization across domains, the GSBPM (Generic Business Process Model, adopted in many countries) could be a suitable framework with IT as an enabler.

2.4 Quality Framework

ICBS practices quality assessment, and uses systematically two frameworks, EFQM and DQAF. These frameworks do not cover all statistics. DQAF covers economic and financial statistics, and EFQM covers statistics on a voluntary basis. It was decided ten years ago to apply the EFQM excellence model, and 9 units have experienced the self-assessment model up till now. A quality steering group has led several initiatives for general improvements.

ICBS is also following the UN Fundamental Principles of Official Statistics and now it would like to introduce a general statistical quality framework that these principles are embedded in, as is in the European Code of Practice. Regional activity within the ENP countries is aiming toward the same goal.

2.5 Statistical Metadata

Metadata exists everywhere in ICBS. Generally, it is produced independently for each purpose or destination using partial and non-formal guidelines. In some specific domains, metadata production is much more standardized but in general, there is no reuse of metadata across domains or over time and metadata quality is only self-assessed by subject units or individuals.

A (non-exhaustive) list of metadata initiatives already taken in ICBS:

- a. Catalogue of questions in surveys.
- b. Glossary of concepts.
- c. Thesaurus (under construction, for the benefit of the new website).
- d. Catalogue of code lists for programmers.
- e. Catalogue of variables for programmers.
- f. First metadata prepared for SDMX, transferring data and metadata to the international organizations
- g. Introductory sections in publication; chapters in the Annual Abstract; subject matter web pages in the website.
- h. Metadata for IMF and other international organizations, for example, metadata for SDDS series published in ICBS website.
- i. Methodological documents created and published by the subject matter and methodology units, and at their responsibility.

The challenges in the current situation are:

- a. Statistical illiteracy of the public at large, difficulties to know what data to use and where to find it, incomplete metadata on the website, users' needs have not been systematically assessed.
- b. Transmission of data to international organizations is not cost-effective, (web services and use of SDMX are partial); the production of metadata is perceived as time consuming by subject matter units; there is a lack of common guidelines for its production; staff is not acquainted with standards (DDI, SDMX). Few cross cutting processes are implemented and units are used to work autonomously.
- c. Relevant metadata is missing at the process level - for systematic planning, methodology, management and integration; metadata production is not integrated with processes; there is a lack of harmonization of standards and metadata across departments; De facto

metadata (parent variables, dictionaries, reference metadata) do not correspond to DDI, SDMX and international standards in general.

- d. Although willing to set up a common integrated metadata system, ICBS is well aware of the challenges in maintaining such metadata updated and active without it being perceived as an administrative burden on the organization.

3. Recommendations

3.1 MR13: Long-term strategic plan for Israeli official statistics

Organization

- A small Strategic Group of around 4 members from top management should lead the project.
- All stakeholders should participate in the process of strategy planning: All stakeholders in important positions in the organization should contribute constructively to the common strategy, management and employees at ICBS, users of ICBS statistics, suppliers of data to ICBS;
- Enhance the functionality and efficiency of the Public Council.
- Consider the possibility of direct rather than indirect funding (through Ministries).

Quality and metadata

- A general framework regarding quality declarations and other metadata should be developed and implemented in the subject matter units. It is important to ensure that the framework is known and accepted in the institution. Arranged seminars and workshops should ensure internal acceptance and ownership.
- While introducing a general quality framework for the whole institution, avoid being over-ambitious and minimize administrative burden on staff.
- Integrate metadata in the ICBS strategy; employ a business process model perspective; Initiate metadata project on quality, on processes and parts in dissemination – e.g. quality declarations.

As for metadata strategy and metadata system, three overall objectives should be declared as the ultimate goals of a metadata strategy, and they should be analyzed in a report to the top level management:

- Cost-efficient production of statistics
- Quality of statistical products
- Fulfillment of user needs on documentation

Recommendations for the metadata system: Although there are examples on very ambitious implementation of metadata systems in Canada, Australia and Sweden, their ideas could be implemented with less or very few resources using standards and standard-solution, taking small manageable steps in the right direction and respecting three fundamental design principles:

- reuse of metadata (one source principle)
- active metadata *and*
- integration into GSBPM.

Recommendations related to end users: Analyze known problems on dissemination (FAQ, typical problem types, e.g. which variables/statistics would be needed by users); Establish focus groups discussing the roles of metadata.

Recommendations at process level: Give general information on benefits of common processes, enhance awareness of the importance of integration to all staff; Implement GSBPM (include translation and adaptation to ICBS). Include requirements on changing of process stemming from the on-going work on the new website; Prepare process documentation to support management, using simple templates. Communicate the purpose of documentation: knowledge management, knowledge on the use of IT etc. Document selected surveys (e.g. 5 to 10 surveys).

Recommendations on standards and technical implementation: Organize training, improve communication e.g. of metadata terminology (DDI, SDMX, GSBPM, GSIM etc.); Harmonization: use SDMX and DDI; Integrate work between Dissemination Unit and Subject Matter Units; Establish common concepts, e.g. Statistical Yearbook, topics and sub-topics; Continue work on common variables and code-lists with a view to moving towards SDMX and DDI; Implement standard DDI and SDMX-tools in order to be cost-effective and to ensure the use of international standards.

Recommendations on the structure of a Metadata and Quality Strategy document for top management .

Micro-data

- Research Services of countries like Denmark, the Netherlands and Sweden could be of interest to ICBS.
- For reasons of confidentiality and ease of use, it is recommended not to give public access to online databases based directly on detailed micro data (table generator).

Statistical database for dissemination

A key element in the strategy is the building of a fully-fledged, all-inclusive statistical dissemination database, so that eventually, all officially published data are derived from the Data Warehouse.

- MS Experts do not recommend relying on a home-grown solution, which would involve uncertainty and costs of development and maintenance. A standard solution will benefit from being maintained, and being further developed according to new trends.
- The MS Experts strongly recommended considering PC-AXIS/PX-Web because it has proven to be easy to implement, users love it, 50 agencies already use it, and it is realistic to implement such a solution within a year.
- The MS Experts strongly recommended using the Common Nordic Metadata Model (CNMM) shared by many countries – even if the PC-AXIS/PX-Web tool is not adopted.
- Two different approaches were proposed to ICBS: starting with a management decision to adopt all recommendations and start the work immediately; OR postponing decision about tools after the pilot stage.
- A typical work plan was suggested.

Data supplier policy

One of the objectives in the Strategy should be to utilize micro data from partners, including: identification of priority areas for new or extended use of administrative data; draft a plan for bilateral discussions with the relevant data owners; MoUs.

The policy should be communicated to data suppliers and other stakeholders.

As a strategy, ICBS' influence in the NSS should increase, legislation adapted and relations with administrative data suppliers improved. At the governmental level, the attention of the

administrative authorities should be drawn to what can be achieved if more or better data are supplied in a more efficient way (digitalization), with the result of maximising re-use and cost-efficiency of ministries' administrative data (collected once, used by many). The main advantages for ICBS will be lowering production costs and improving quality with regard to coverage, data validation (although for administrative purposes), burden reduction on the public and enhanced flexibility in statistics production as a result of the full coverage (instead of samples).

Ministries and public will gain clear benefit from a good cooperation:

- a. Maximizing use of public pool of data / knowledge
- b. Well-founded definitions of variables and classifications
- c. Errors corrected (and preferably avoided) at the source
- d. Measurement and improvement of data quality
- e. Reduction of response burden
- f. Credible use of tax payers' money

Therefore, ICBS data supplier policy would emphasise the following:

- a. Supply of administrative data to ICBS, mandatory and free of charge (in principle *and* in practice).
- b. Written bilateral agreements, including: Purpose of delivery, data content (units, variables, format, metadata etc.), roles and responsibilities, technical matters, communication about errors, contact persons, steering group and/or implementation teams etc. Special attention should be given to IT services being given to ministries by private providers.
- c. Confidentiality.
- d. Easy and digitalized reporting.
- e. Special reporting arrangements with (few) large enterprises, accounting for a high percentage of the economic activity, which are generally complex in structure and participate to most/all surveys: ICBS will institute "VIC" services in order to insure figures about them being reliable and coherent across statistical domains.
- f. Involvement of users (data suppliers) in the design of transmission tools and methods.
- g. Checking of reported data. Businesses may be contacted in case of errors. Error corrections are *not* transmitted back to source administrative authorities.
- h. Cooperation between ministries and ICBS in the design of good quality administrative data on individuals or businesses, based on unique identifiers. Preferably, ICBS will be involved from the start in the design of administrative files in ministries, and cooperative ongoing methodological cooperation established.

3.2 MR14: Procedures for long and short term planning

- Strategic planning should be used as an organizational framework:
 - For external communication with professional users, data suppliers, potential employees. It could be useful in contact with grant-awarding authorities.
 - For internal communication – setting common priorities, objectives and standards, and coordinating efforts of management and employees.
- The policy will indicate the direction for the development of the organisation through:
 - Mission, vision, next steps/activities, objectives for strategic areas
 - Specification of benchmarks

- Strategic planning will follow a business process perspective, covering the three types of processes: Core statistical production, management, and support (quality, metadata, methods and IT). Plans, implementation results and changes needed to be incorporated in next plans, should be all appreciated in the light of their added value to end users.

3.3 MR 15: Enhancement of ICBS engagement in the NSS

Cooperation and coordination with other statistical producers should be part of the strategy for the coming years. A pragmatic approach should be adopted: Contacting authorities, seeking mutual benefits and trying to define standards in cooperation.

- Regarding the NSS hub uniting official statistics from all national sources:
 - In the shorter term, it will probably be loosely coupled, and in this phase ICBS should build a database that gives coordinated access to all of ICBS statistics, and refer to this database through the hub.
 - In the longer term, ICBS should strive to have it become a common platform for the statistics of as many other statistics producers as possible.
- Regarding NSS enhancement, it is recommended to use PCS to get acceptance:
 - A subcommittee for preparing better coordination of the NSS should be set.
 - Discuss a sharper legislation that clearly defines responsibilities of coordination
 - Ordinance Implementation: Setting a National Plan for official statistics in 2015
 - Branding: A system of branding of Official Statistics no matter where it is produced should be set. Branding would require fulfilment of quality standards similar to those of ICBS and the CoP.

4. Implementation of the mandatory results, sources and methods

4.1 MR13: Long-term strategic plan for Israeli official statistics

Topics, strategic objectives and related activities for 2015-2020 were defined by the top management. An integrated plan was defined, prioritizing 7 principles of the CoP:

- Users oriented statistics production, while answering changing needs;
- Commitment to quality;
- Micro-data confidentiality;
- Development of statistical information;
- Cooperation and coordination of the NSS;
- Ensuring an on going cooperation of data suppliers;
- Managerial, operational, economic and marketing efficiency.

The detailed plan (Annex 1) was presented to the Public Council for Statistics on February 15th, 2015 and a discussion has started. Some modifications are expected, especially in objectives which have impact on the NSS and its coordination by ICBS and by the PCS.

The main output of component C has been generated “behind the scenes”, and strongly influenced the leading principles of the strategic plan elaborated during the project:

Code of Practice: ICBS has decided to adopt the ES CoP with the adjustments made to the region. Planning is led by selected principles. The discourse in ICBS includes CoP conceptualization. The first ICBS strategy (2015-2020) is organized around seven prioritized CoP principles, and this method will be adopted for the following strategies.

ICBS is willing to adopt common internal policies and tools derived from the EU Code of Practice and QAF, seminars and workshops are planned to ensure knowledge and acceptance.

Specific strategies: The culture of planning for the long run widely infiltrated into the organization, and besides a dissemination strategy (MR22), a need for plans was realized in other specific domains: Metadata, and Data suppliers. The Government Statistician has nominated a steering committee and an implementation team for Metadata. Both has started a learning process and discussions.

Public Council for Statistics and the NSS: The new PCS prioritizes infrastructure discussions related to strategic planning. One of which is the reviewing of the adherence to international standards and planning for bridging the gaps.

The role of the users: Users were approached and proved to be a resourceful and contributing to the understanding of future needs. A plan for generating systematically users and users' feedback will be derived from the dissemination strategy (see component E report).

Re-organization: ICBS is going through a major reorganization that incorporates some of the related recommendations. Moreover, specific and urgent issues were already addressed on the organizational level: Metadata steering committee and implementation team were established and a new team was defined for building the system to be called NSS.

4.2 MR14: Planning system for the long-run and for the short-run

A system and procedure for a short run planning already exists in ICBS. An annual work-plan serves for allocating human resources and for budgeting. It is a detailed work-plan for organizational units, projects, and individuals, that is further detailed on a quarterly basis. This information is used for awarding premium to workers based on completing tasks toward goals with specified human resources and budget.

This short term plan may reflect projects to be completed in several years. Yet it has no reference in a strategic plan.

For that end, a procedure was drafted aiming at building a strategic plan (based on international experience), prioritizing statistics development and allowing quite wide margins for contingencies. Evaluation of needs, monitoring relevance and their fulfillment, are to be used for the modification of the short term plan and for updating the strategy (frequency is to be determined). See Annex 2.

Independently of the Twinning project, ICBS 2015 annual work-plan has been formulated and discussed in the management forum during the last quarter of the project. Once the strategic plan will be finalized, it will be used in practice for the first time by ascribing the 2015 work-plan to the strategic goals in the strategic plan. This process will be used as a pilot, allow for a systematic follow-up of 2015 annual plan, and help in the evaluation of the relations between the short and the long term plans, including organization and follow-up procedures needed.

4.3 MR15: Enhancement of ICBS engagement in the NSS

The NSS

Partners in the NSS were identified and participated in twinning activities, their statistical products partially identified. They expressed a clear need for ICBS to support and guide them with internationally accepted methodologies and standards.

Work on MoU with the NII has started, talks on MoUs with several Ministries has begun.

The twinning project, and especially the RTA himself, strengthened significantly the coordination and cooperation with the Bank of Israel: Monthly meetings, joint study visits and activities, joint reports. Statistics plans were introduced to the work-plan of the Bank of Israel for the first time, and resources were allocated for this end.

Future plans will include the –

- a. Continuation of the partnerships with statistics producers in government agencies, when participating in international activities;
- b. Using European tools and mechanisms of self-assessment quality-questionnaires for coordination of the NSS and improvement of official statistics.
- c. Working on MoUs or other agreements with the main partners in the NSS
- d. Definition and content of official statistics is being worked on in ICBS for future budgeting and division of labor within the NSS.

The Public Council for Statistics (PCS)

A new Chairman was nominated during the twinning project along with the nomination of its members, aiming to have representation of all partners in the NSS.

The Chairman is leading a systematic work for the PCS to fulfill its goal of coordination of the NSS according to the statistical ordinance. Mechanisms suggested and started being implemented are:

- a. Reviewing existing statistical programs and suggesting development of new statistics
- b. Promoting MoUs between ICBS and its partners in the NSS, in order to institutionalize the relations and promote coordination
- c. Monitoring closer than before the work done in its committees (which are inter-ministerial committees).
- d. A PCS subcommittee for enhancing the NSS is proposed.
- e. ICBS is planning a sharpening of the Statistical Ordinance regarding coordination, which will clarify the mandate for coordinating the whole system of official statistics production (NSS).
- f. The draft strategy is to be discussed and endorsed by PCS.

Parallel to the PCS, the State Control Committee of the Knesset summoned PCS and ICBS to report on the progress made regarding the coordination of the NSS and the quality of the statistics produced by the partners and published by ICBS, following the State Comptroller Report (Nov. 25th, 2014).

Spivac PCS sub-committee has defined a pilot aiming to build a single portal for the NSS, with socio-economic data.

5. Impact

5.1 MR13: Long-term strategic plan for Israeli official statistics

As detailed in 5.1, the main output of component C has been generated “behind the scenes”. The business process of statistics production in ICBS was put in question and as a result, specific strategies and policies were discussed and put as a priority in ICBS agenda. EU regulations and recommendations regarding statistical Quality, Metadata, Generic Statistical Business Process Model and dissemination policy were widely adopted.

Moreover, ICBS is going through a major reorganization that incorporates some of the related recommendations. Metadata steering committee and implementation team were established and a new team was defined for building the system to be called NSS.

5.2 MR14: Planning system for the long-run and for the short-run

The work done in the twinning project is serving the requirement of the government administration to provide the Prime Minister Office with an updated strategic plan and with an annual plan each year, starting in 2017.

5.3 MR15: Enhancement of ICBS engagement in the NSS

The Twinning project included activities that involved data users, data suppliers and statistics producers. During these activities ICBS has discovered interested parties who need and would like to be involved in the NSS, more than anticipated.

The new Chair of the Public Council for Statistics is leading a clear agenda for the coordination of the NSS.

The State Control Committee of the Knesset follows the implementation of the recommendations of the State Comptroller regarding the consultation obligation of the government ministries and the coordination of the NSS by the Public Council for Statistics.

The outcomes of the twinning project enable ICBS to react constructively to needs expressed and to just criticism beyond the mandatory result as defined at its very beginning.

6. Sustainability

6.1 MR13: Long-term strategic plan for Israeli official statistics

Requirements and recommendations on three levels, adopted voluntarily or non-voluntarily, make the working according to long term strategic plan as the only option for the production of official statistics:

- 1 ICBS perceives itself as part of the **international** statistics community. As such, a major part of its work plan corresponds to the agreed on development plans on the international arena, mainly in the IMF, OECD, and in the UN and its main agencies.

Moreover, the time schedule for adopting new standards and guidelines for the production of statistics, is more or less internationally agreed on.

- 2 From **Intra-national** perspective, recent requirement of the government administration is to provide the Prime Minister Office with an updated strategic plan and with an annual plan each year, starting in 2017.

- 3 **Inter organization** processes also come to serve the culture of long term planning where the budget constraints are the catalyst for reorganization and for the modernization of the production process.

6.2 MR14: Planning system for the long-run and for the short-run

Short term planning (annual and quarterly) is well established in ICBS. The development of a culture and of infrastructure processes for long term planning will increase certainty in the short term planning and will increase efficiency as the contingencies margins will narrow down.

6.3 MR15: Enhancement of ICBS engagement in the NSS

The Government Statistician with the support of the Chair of the Public Council for Statistics has taken their duty to manage and coordinate the NSS as a priority in their work-plans. The Government Statistician has assigned designated staff for that end, in addition to an

enhanced mandate for the existing international relations and statistical coordination department, to further engage in agreements with all stakeholders in the NSS.

From the partners' perspective, the involvement of ICBS in ensuring quality of their statistical work is needed and welcome.

7. Conclusions

Engaging planning for the long run and coordinating the NSS are basic infrastructure processes needed at times of increasing information demands and of decreasing resources to address them.

The twinning project leveraged most needed changes in ICBS to better answer users' needs, from quality and efficiency perspectives, where users are local or international organizations. It is not only a structural change but rather a cultural one, and therefore will take a while to be fully implemented.

Yet, the road was paved, the twinning project has proved to be very useful to motivate the power that be to initiate major changes, and it will certainly be one of the instruments to be used in the future for further development of statistics in Israel.

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Annex 1 Toward a Strategic Plan for ICBS

ICBS strategic objectives and principles of practice for 2015-2020 derive from the European Statistical Code of Practice that was adopted by ICBS, as follows:

1. Users orientation statistical production, while addressing changing needs
2. Commitment to quality
3. Micro-data confidentiality
4. Development of statistical information
5. Cooperation and coordination with producers of official statistics in the NSS
6. Ensuring on-going cooperation of data suppliers
7. Managerial, operational and economic efficiency

1. Users oriented statistical production, while addressing changing needs

#	Strategic Objectives	Activities toward the objectives
1	Users oriented dissemination policy	<p>1.1 Definition and formulation of dissemination policy as part of the general strategy of ICBS</p> <p>1.2 Regulation of the relations with customers as part of the dissemination policy</p> <p>1.3 Build online dissemination paths for different groups of customers on the website – Reorganization of the information on the website, powerful search engine, improving user-machine interfaces by new technological tools and by metadata system. Data oriented website, supporting flexible products, free queries and allowing for personalized generation of statistical data.</p> <p>1.4 Dissemination of updated information on social networks (Twitter, Facebook).</p> <p>1.5 Increase the involvement of users in the definition of information items to be disseminated and their accessibility modes by feedback questionnaires, users and uses surveys, focus-groups etc.</p> <p>1.6 Develop/purchase a system for monitoring and managing demands and needs of the public addressing ICBS by e-mail and on the phone.</p> <p>1.7 Increase the use of statistics and evidence-based decision making, by public relations, supporting material (Pamphlets, promotion videos, seminars and workshops etc.), and designated campaigns to foster relations with mass media. This is aiming to have actual and potential users be aware of data availability.</p> <p>1.8 Ongoing meetings with DGs of Ministries, with statistics producers, data suppliers and potential users.</p> <p>1.9 Implement an active policy with regard to misuse of statistical data.</p>
2	Single point access to all information items and services for users and customers	<p>2.1 Establish a single source dissemination to enhance efficiency, standardization and harmonization of content.</p> <p>2.2 Establish one statistical database as the only source for all disseminated data and statistical products.</p> <p>2.3 Give users access to full scale, user friendly, macro database with non-confidential data (non-identified and non-identifiable).</p> <p>2.4 Enforce single gate for dissemination, by supporting procedures and tools.</p> <p>2.5 Manage dissemination with full control and monitoring tools</p> <p>2.6 Develop and maintain a documentation system for all tailor-made data provided to customers (complete logs).</p> <p>2.7 Provide designated training to writers of press releases in subject matter units, including dissemination procedures and writing guidelines</p>
3	ICBS website as the main dissemination center / access point to all information authorized to be published	<p>3.1 All published information answers clear criteria of quality and relevance to the public</p> <p>3.2 Reorganization of the website and its presentation.</p> <p>3.3 Building a generic tables-generator</p> <p>3.4 Powerful search engine covering all disseminated information and infrastructures to support development (like thesaurus).</p> <p>3.5 Development and implementation of quality control procedures on services.</p> <p>3.6 Equal accessibility to all</p>

2. Commitment to quality

#	Strategic Objectives	Activities toward the objectives
1	Defined NQAF – National Quality Assessment Framework	<p>1.1 Formulation of a policy on statistical quality, adoption of national and international standards for quality frameworks</p> <p>1.2 Adoption and adjustment of standard tools for managing and evaluating statistical quality</p>
2	Ongoing quality improvement	<p>2.1 Produce and make available, updated statistical information available to all: Publication according to pre-planned and published ARC-Advanced Release Calendar (monthly, quarterly and yearly statistics).</p> <p>2.2 Produce reliable statistics, evaluated by quality criteria set in the ICBS dissemination policy (relevance, coherence, confidentiality, transparency etc.)</p> <p>2.3 Implement a multi stage and integrated evaluation plan, based on self assessment, peer review, and metadata analysis, of processes and products in ICBS and in the NSS</p> <p>2.4 Review the actual use of official statistics in decision making processes</p> <p>2.5 Measure public trust in statistical data</p> <p>2.6 Publication of quality reports and recommendations for improvement</p> <p>2.7 Update work-plan (and capacity building, if required) for the implementation of the recommendations, monitor implementation of the recommendations and report findings in the following evaluation report.</p>
3	Development and improvement of statistical methods	<p>3.1 Develop and implement advanced statistical methods in addressing problems of non-response, impact of research methods, small area estimation, time series analysis, imputation, statistical disclosure.</p> <p>3.2 Set up qualitative and uniform sampling frames for integrated and "smart samples"</p> <p>3.3 Integrate multi-source information for generating more reliable estimates</p>
4	Ongoing improvement of the professional level of ICBS staff	<p>4.1 Set up and implement workers training policy adapted to roles and functions: required core competences, advanced competences and special competences.</p> <p>4.2 General training of workers to be better acquainted with the world of knowledge of ICBS</p> <p>4.3 Verify that workers know and understand the statistical concepts used in ICBS</p>
5	Adoption and implementation of international standards and framework for statistical metadata	<p>5.1 Select and adjust metadata standards for the production of clear and meaningful statistical information: provide quality declarations, explanations and definitions, online glossary of terms and system of FAQ - "frequently asked questions", standardization in the presentation of the information</p> <p>5.2 Training workers</p> <p>5.3 Adoption of documentation standards in the business processes of statistical production</p>
6	Having an updated central system for documenting and managing metadata	<p>6.1 Review current status</p> <p>6.2 Set up documentation objectives regarding the four central components of the system: concepts, quality declarations, variables, classifications and codes.</p> <p>6.3 Characterize uses of the system: building and updating quality declarations, supporting internal processes, providing metadata to the website and to the international organizations.</p> <p>6.4 Choose/purchase/adjust the system to the required standards.</p> <p>6.5 Plan the implementation of metadata projects</p> <p>6.6 Set up an organizational structure to enable the implementation.</p> <p>6.7 Train workers to use the system and to produce metadata</p>

		6.8 Ongoing uploading of metadata to the system and automatic generation of dissemination metadata 6.9 Characterize and implement processes of metadata quality control
	Using metadata system in management of production processes	7.1 Harmonize metadata 7.2 Questionnaires design and production 7.3 Define files for users 7.4 Measure and document needs and satisfaction of internal and external users

3. Confidentiality and accessibility of individual data

#	Strategic Objectives	Activities toward the objectives
1	Strengthening information security and maintain data confidentiality	1.1 Strengthening data security in accordance with the requirements of the governmental system
2	Accessibility of individual data to researchers	2.1 Define policy and specific strategic plan for providing researchers access to individual data, aiming to balance security and confidentiality rules, while fostering research. 2.2 Improve the legal infrastructure for making un-identified individual data accessible to researchers. 2.3 Build technological infrastructures for the implementation of the strategic plan 2.4 Operate a system for accessing individual records and maintain it. 2.5 Ensure the allocation of budget and human resources for uninterrupted and efficient operation.

4. Development of statistical information

#	Strategic Objectives	Activities toward the objectives
1	Production of census information, using non-traditional methods	1.1. Check alternatives to the traditional census to serve as the main infrastructure of the statistical system 1.2. Develop and improve census methodology
2	Statistics for specified geographic areas and population groups	2.1. Development, improvement and accessibility of spatial statistics by fixed geographic areas and for custom-made areas (on demand) 2.2. Development and improvement of regional indices 2.3. Development and improvement of statistics of ethnic and other minorities
3	Input-output tables	3.1. Plan and implement the production of input-output tables once in 5 years.
4	Well-being and sustainable development statistics	4.1. Complete breakdown of and comparison between population groups for the available indicators 4.2. Conduct ongoing Time -use Survey for the completion of missing indicators 4.3. Methodological development of new indicators 4.4. Develop sustainability indicators according to capital approach 4.5. Development of resilience indicators 4.6. Cooperation with the National Economic Council and government ministries in establishing an ongoing process for checking and updating the indicators 4.7. Regular annual publication of quality of life indicators and sustainability indicators
5	Green Growth	

5. Cooperation and coordination with producers of official statistics in the NSS

#	Strategic Objectives	Activities toward the objectives
1	Strengthening the NSS to efficiently answer information needs	<ul style="list-style-type: none"> 1.1 Use PCS to understand the long term needs of the NSS 1.2 Set up a multi-year statistical work plan for the whole NSS, that reflects the needs as reflected by all producers 1.3 Regulate the NSS with MoUs – Strengthen relations with government Ministries and other national producers of statistics 1.4 Legislation supporting NSS needs
2	Coordination of the NSS in adherence to international quality standards	<ul style="list-style-type: none"> 2.1 Empower the Public Council for Statistics to implement its coordination functions as defined by the Statistical Ordinance 2.2 Define official statistics and core statistics 2.3 Determine policy as of the binding standards and their adjustments to the reality in Israel 2.4 Set up a detailed work-plan for adopting the standards 2.5 Systematic support, guidance and cooperation with research units and information units in public organizations 2.6 Division of labor within the NSS regarding the production of official statistics 2.7 Set up policy regarding the involvement, cooperation and coordination of ICBS with the international organizations and with NSIs abroad 2.8 Coordination within the NSS for representation at conferences and working groups and for data transmission to international organizations and other entities abroad. 2.9 Signing MOUs with national statistical institutes abroad
3	Assessment of quality and completeness of official statistics produced by the NSS	<ul style="list-style-type: none"> 3.1 Sharing technological platforms and generic tools 3.2 Develop technological infrastructure for collecting information (assessment questionnaires) and reporting assessment results 3.3 Training personnel to perform the evaluation 3.4 Evaluation of the actual coverage and quality of the official statistics produced 3.5 Branding the statistics produced by the NSS as official statistics
4	Building a statistical information center for all official statistics in Israel	<ul style="list-style-type: none"> 4.1 Adjust ICBS website to give access to all / most official statistics 4.2 Spivac Committee: decision-making and work plan for the development of a socio-economic data center 4.3 Implementation of the recommendations of the committee for making data available to the general public 4.4 Manage and coordinate between the agencies about contents and accessibility

6. Ensuring on-going cooperation with data suppliers

#	Strategic Objectives	Activities toward the objectives
1	Regulation of relations with data suppliers	<p>1.1 Build inventory of administrative files and define updating procedures: content, updating frequency, contact person in ICBS</p> <p>1.2 Set up MOUs agreements with administrative bodies</p> <p>1.3 Transparency of procedures and rules of data security and data confidentiality</p> <p>1.4 Strengthening ties with data sources for increasing motivation to participate in surveys</p>
2	Reduced response burden in business surveys	<p>2.1 Set up an overall management system of sampling units, research units and reporting units in all business surveys</p> <p>2.2 Create dependent and "smart" samples in sampling small businesses</p> <p>2.3 Locate and reduce duplications in the questionnaires</p> <p>2.4 Check necessity of questions in questionnaire</p> <p>2.5 Develop and calculate periodical indicator for response burden</p> <p>2.6 VIC (Very Important Companies) treatment</p> <p>2.7 Develop internet questionnaires</p> <p>2.8 Measure perceived response burden, using short feedback questionnaire</p>
3	Reduced response burden in household surveys	<p>4.5 Ongoing search for alternative data sources (administrative databases, registers)</p> <p>4.6 Integration of data sources: administrative sources and surveys</p> <p>4.7 Setting up a policy with regard to inclusion of a family in samples of several surveys</p> <p>4.8 In panel surveys – reducing re-questioning</p> <p>4.9 Locating and reducing duplications in the questionnaires</p> <p>4.10 Checking necessity of questions in questionnaire</p> <p>4.11 Reducing the number of visits of a family in the same survey to the efficient essential minimum</p> <p>4.12 Special treatment of weak populations like the elderly</p> <p>4.13 Development of internet questionnaires</p>

7. Managerial, operational and economic efficiency

#	Strategic Objectives	Activities toward the objectives
1	Managerial efficiency	<p>1.1 Develop general strategy, updated every three years, clear to all people, motivated by strategic objectives, and includes leadership, building capacities and HR planning</p> <p>1.2 Define and manage prioritization policy</p> <p>1.3 Clear definition of objectives and feasibility of their achievement</p> <p>1.4 Set up objective criteria for evaluation of alternatives and priorities order</p> <p>1.5 Plan flexible margins in terms of objectives and requested inputs for their accomplishment, to enable answering unexpected needs (contingency)</p> <p>1.6 Measure the effectiveness of results vis-à-vis budget, objectives and outliers, and plan amendment action</p> <p>1.7 Increase ICBS influence on the direction of statistical development by increasing its involvement in the international decision-making hubs.</p> <p>1.8 Implementation of ICBS role as the leader of the NSS entails allocation of adequate resources and building capacity to reach common NSS goals.</p>
2	Operational efficiency	<p>2.1 Collect relevant information by domain, check alternatives and compare costs</p> <p>2.2 Assign person responsible for reviewing procurement and alternative processes</p> <p>2.3 Reduce production time, using technology – computerization of surveys</p> <p>2.4 Create working environment for analyzing evaluation outcomes and for monitoring implementation of recommendations</p> <p>2.5 Integration of tools in ICBS</p> <p>2.6 Increase output by international, bilateral and multilateral activities</p>
3	Economic efficiency	<p>3.1 Manage and improve procurement and tenders processes</p> <p>3.2 Efficient use of economic resources</p> <p>3.3 Improve the ability to use administrative data</p> <p>3.4 Expand data collection processes using technological means (internet, files...)</p> <p>3.5 Improve infrastructures and databases to serve more users in cross sectional domains</p> <p>3.6 Improve hardware and software systems</p> <p>3.7 Down root generic work processes, identical methods; using GSBPM</p> <p>3.8 Develop or adopt generic systems in use, in statistical organizations around the world</p> <p>3.9 Ongoing use of international aid tools (TAIEX, Twinning, Reviews)</p>

Annex 2. Systematic planning for the long-run and for the short-run

The synchronization of a long run and of a short run plans has to take into account some key elements in order to optimally address users' needs:

Stakeholders:

- Main users: Policy makers (national and local administration), International organizations, media, other key users;
- Data Suppliers: in a direct data collection (individuals, households, businesses) and indirect data collection (administrative sources, public and private).
- Statistics producers: The NSI and other partners in the NSS,

Needs:

- Current needs,
- Development requirements,
- Future (foreseen) needs and contingencies (unforeseen).

Enablers:

- Legal Framework,
- Institutional Framework: NSS and NSI's management, production structure production culture,
- Technological infrastructures;
- Human resources (professional),
- Budget

The expected process is, basically, to identify needs, to prioritize them according to the vision-mission of the organization, to plan the implementation according to the current and the potential resources, and to keep adjusting the plan according to modified and changing needs, and according to the available and expected resources.

On a parallel level, the NSI should change and adjust the legal framework and the institutional framework (long term processes).

The following activities' order corresponds to the above logic and principles, taking into account present situation in the NSI. It is divided to three parts:

1. Long-term strategic planning
2. Short- term planning
3. On-going updating of both

1. Long-term Strategic Plan (based on the strategic objectives defined)

#	Activity	Deadline
1	Discussion of the strategic objectives document, in the Public Council for Statistics	Dec. 2015
2	Prioritize objectives and activities according to decisions already made, based on operational and budget constraints	June 2015
3	Prioritize objectives and activities according to known national needs, including government decisions already made (like the national strategic objectives)	Oct. 2015
4	Prioritize objectives and activities according to the international agenda	Oct.2015
5	Assign responsibilities on organizational units	Mar. 2016
6	Identify organizational changes needed for the implementation (formal structure/task forces/committees)	Mar. 2016
7	Establish designated units as needed	Mar. 2016
8	Secure resources in the short term plan	Apr. 2016
9	Expand the long term objectives to cover all official statistics	June 2016
10	Establish (with the Public Council for Statistics) a division of labor within the NSS to lead a coordinated production of official statistics	Dec. 2016
11	Identify future processes and wanted results that require changes in the Statistics Ordinance	
12	Introduce changes to the law in the relevant venue in the Knesset	2016-2017

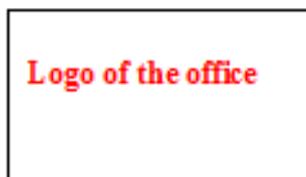
1. Short-term Plan

#	Activity	Deadline
1	Ascribe activities in the annual plan for 2015 to long term objectives	June 2015
2	Ascribe activities in the annual plan to official statistics	Sept. 2015
3	Identify the motivation for all other statistical activities	Sept. 2015
4	Induce production policy for 2016 and on (completing obligations, rejecting development not in line with official statistics...)	Sept. 2015
5	Collect, analyze and prioritize users' needs vis-à-vis long term objectives, official statistics, policy principles	
6	Shape 2016 work plan according to the policy, to short term priorities and to available human, technological and budget resources	Oct. 2015
7	Plan for contingencies	
8	Secure budget	

2. Updating the long and the short-term plans

#	Activity	
1	Collect and analyze needs of key stakeholders	
2	Collect and analyze requirements and recommendations of the International organizations	
3	Evaluate how well ICBS answers users' needs	
4	Analyze current state and identify the gaps	
5	Plan for bridging the gaps (production processes, infrastructures, human resources, budget, legal framework)	
6	Re-visit the vision and mission of ICBS	
7	Discuss long term objectives in ICBS, in the Public Council for Statistics and in the NSS	
8	Update strategic plan accordingly	
9	Decide on the short term activities deriving from the gap-analysis to be integrated to the on-going short term plan	
10	Compare derived plan with on-going short term plan and adjust according to policy, priorities, enablers and constraints	
11	Evaluate annual progress according to long term objectives	
12	Re-analyze stakeholders needs	
13	Identify short comes on the NSS level	
14	Coordinate and adjust the short term plan for ICBS based on agreed on division of labor in the NSS	
15	Plan for contingencies, based on gaps between initial plans and actual activities	
16	Adjust production/dissemination policy, aiming to narrow down contingencies to the necessary only	

Annex 3. Generic Memorandum of Understanding



מרכז המידע המרכזי
Central Bureau of Statistics
משרד המבחן

Central Bureau of
Statistics

Memorandum of Understanding

between

Office name

and

The Central Bureau of Statistics

Jerusalem, *date*

1. General background

1.1 Areas of cooperation

The Central Bureau of Statistics (hereinafter: the CBS) and *Office name* (hereinafter: *Office name*) have been cooperating for years. This cooperation has taken place in various fields, which may be divided into three main categories:

1.1.1 Sharing of information:

- Areas in which the CBS provides *Office name*, like....
- Areas in which *Office name* provides data and statistical series to CBS, like....

1.1.2 Development

- Areas in which the CBS and *Office name* cooperate for the development and advancement of topics concerning the national statistics (e.g., cooperation relating to the national balance sheet).

1.1.3 International activities

- Reporting to international organizations.
- Representing the State in international committees, working groups, seminars, and conferences.

Thus far, this cooperation has taken place on the basis of initiatives and cooperative arrangements that are derived from the role of the CBS per se, or through ad hoc cooperative ventures, specific requests from *Office name* to the CBS (sometimes on a contractual basis), or as a “natural” consequence of *Office name’s work, in the areas of...*

1.2 Functions of the organizations

Office name, as well as CBS, is a provider of official statistics in the National Statistical System:

- *Office name* compiles the XXX statistics, which are seen as part of the National Statistical System (NSS). Users (incl. international organizations, see 1.1.3 above) should be able to easily use statistics from the NSS together, and they should be reassured of the quality of the NSS statistics according to international standards.
- Cooperation between central statistics bureaus and *Office name* is the norm in many countries, for two main reasons: both institutions are their countries’ main statistical “agencies” and both are producers and distributors of statistics at the national level. This is derived from the very nature of these institutions’ functions in the country’s economy and society:

The CBS is the central government entity whose function it is to collect, process, and publish statistical information about Israel’s population, economy, and society. The CBS operates pursuant to the Statistics Ordinance, which defines the Bureau’s goals and its *modus operandi*. The information collected and processed by the CBS is used by government offices, mainly for planning and making policy and for monitoring developments. The CBS is also responsible for coordinating the statistical activities of State institutions and advising them on statistics-related topics.

Office name discharges a variety of functions that have been assigned to it by the Law, which are...

1.3 Cementing relations between the CBS and *Office name* in a formal document

Thus far, no attempt has been made to anchor the totality of relations and contacts between these two organizations in one formal document that would define, systematically and consensually, areas of responsibility, joint working processes, a format for cooperation and development of new topics, a level of service for services that are provided bilaterally, a conflict-resolution mechanism, a mechanism for the coordination of work-plans and the advancement of new initiatives, etc.

The need for such mechanisms is derived from an interest in maximizing the potential involved in inter-organizational cooperation regarding the development and use of

statistics at the national level, and in preventing redundancies at the national level, enhancing both organizations' operating efficiency with regard to statistics, reducing expenses where possible, and improving resource allocation in areas of overlap and contiguity between the organizations.

This process is also consistent with the recommendations of an International Monetary Fund assessment team which recommended, in its ROSC report prepared in November 2005, the establishment of a mechanism for cooperation between these institutions:

The CBS, together with the BOI, the MOF and other relevant agencies, should establish working groups on standardizing statistical production. The mandates and modus operandi of such working groups should be formalized so as to, *inter alia*, better exploit possible synergies in statistical processes.

A formal system that defines relations between *Office name* and the main statistical office is standard throughout the world. In this sense, the execution of a cooperation document between the CBS and *Office name* and the formal regulation of the organizations' relationship aligns us with the current situation in this field in the developed world.

2. Guiding principles and main goals

2.1 Guiding principles

- 2.1.1 Systematic cooperation between *Office name* and the CBS is based on mutual cognizance of each party's relative advantages.
- 2.1.2 Each party will provide the other party, as best it can, with the optimum conditions for the full and efficient attainment of its goals.
- 2.1.3 Collaborative activities will take place via synergetic processes that aim to amplify the organizations' ability to discharge their duties professionally, without compromising on accepted criteria of statistical quality.
- 2.1.4 Both organizations aspire to operate efficiently and prevent redundancies in the collection and management of statistics at the national level, and to cooperate in initiating, promoting, and carrying out new initiatives.
- 2.1.5 Both organizations have adopted the IMF recommendations regarding cooperation in the production of national statistics, using the customary standards in the National Accounts system and those for the production of policy-relevant fiscal data, and they will inform each other of differences in definitions.
- 2.1.6 Principles concerning specific matters and operations in which the two organizations cooperate will be specified in the appendices to this memorandum.
- 2.1.7 This Memorandum of Understanding will be subjected to periodic review for the purpose of adjustment to changing needs and realities. Future appendices will be attached to this Memorandum and will constitute integral parts thereof.

2.2 Principal objectives

- 2.2.1 To prevent redundancies and inconsistencies at the national level in the collection and dissemination of national statistics.
- 2.2.2 To specify the format for cooperation in the collection and preparation of statistical data *in the area of...* and the reporting of national statistics to international entities—in areas in which *Office name* has a function to discharge by force of law and in which it has an interest in collecting information and data *from ...* Within this framework, the parties will conclude agreements relating to each organization's relative advantages, and will decide, in accordance with these, on the division of responsibility between them.
- 2.2.3 To define the level of service and commitment that each party owes the other in the delivery of data (a service level agreement), so that each party will be able to discharge its duties optimally (insofar as this depends on the collection and provision of statistical data).
- 2.2.4 To define discuss-and-consent mechanisms in professional matters relating to the methodologies used in preparing the national statistics, including a consent-and-

decide mechanism and the establishment of a decision-making forum that will bind both parties. Within this framework, each party will be given an opportunity to have an impact on the other party's professional decisions in the field of statistics.

- 2.2.5 To determine the format for cooperation and standardization in the publication of statistical information by each organization, the dependency of each organization's publication dates on those of the other organization, and the two organizations' powers and responsibilities regarding the reporting of data to international entities (i.e., who reports and with regard to which matters), etc.
- 2.2.6 To define a mechanism for cooperation in the field of technological infrastructure in order to make the allocation of investment budgets in the technological context more efficient and to assure cooperation in cross-organizational projects (e.g., regarding the implementation of international standards at the national level).
- 2.2.7 To establish permanent consult-and-decide forums in fields of interest to both parties.
- 2.2.8 To determine how the State will be represented in international forums and organizations in matters related to official statistics, in order to project a message of uniformity and consistency at the State level vis-à-vis international entities.
- 2.2.9 To define mechanisms and rules for ensuring consistency in the statistical data that are used and published by the two organizations.
- 2.2.10 To define mechanisms and rules for ensuring consistency in the statistical metadata that are used and published by the two organizations.
- 2.2.11 To create an organizational, technological, and statutory environment for inter-organizational data sharing, in a manner that allows each organization to maximize the potential of the information that both organizations possess, in order to achieve the objectives of one of the organizations, without prejudicing the privacy rights of the reporting parties.

3. The statutory framework

The activities of the CBS and *Office name* are statutorily defined. The following is a capsule description of each institution's statutory framework.

3.1 The CBS

- 3.1.1 The CBS gathers and publishes official statistics pursuant to the Statistics Ordinance (Revised Version), 5732-1972.
- 3.1.2 Section 3 of the Ordinance specifies the functions of the CBS:
 - 3.1.2.1 Statistical operations and the publication of their results;
 - 3.1.2.2 Cooperation with State institutions;
 - 3.1.2.3 Preparation of general multi-year plans for the statistical operations of State institutions;
 - 3.1.2.4 Establishing standard statistical classifications;
 - 3.1.2.5 Coordination and publication of information regarding statistical operations.
- 3.1.3 The CBS is Israel's central institution for the collection, processing, and publication of the official statistics of the State of Israel.
- 3.1.4 The CBS is an independent unit affiliated with the Office of the Prime Minister; it is headed by the Government Statistician.
- 3.1.5 The duties of the Government Statistician pursuant to the Ordinance include the following:
 - 3.1.5.1 Directing the government statistical system;
 - 3.1.5.2 Formulating rules for the performance of surveys and for the use of administrative databases;
 - 3.1.5.3 Ensuring of the publication of the results of the statistical operations carried out by the CBS;

- 3.1.5.4 Enforcing mandatory sharing of information with the CBS, while ensuring compliance with the requirement that confidentiality be maintained with regard to information received by the CBS.
- 3.1.6 The Statistics Ordinance does not dictate the CBS' working methods.
 - 3.1.6.1 The Ordinance does state that the Government Statistician, who heads the CBS, will exercise his/her powers on the basis of scientific considerations and in an objective and professional manner.
 - 3.1.6.2 Furthermore, Section 8 of the Basic Law: Human Dignity and Freedom states that when privacy is compromised by force of law (e.g., by the Statistics Ordinance), the infringement must be "proportionate"—i.e., not unnecessarily severe.
- 3.1.7 The Statistics Ordinance sets forth various methods of cooperation between the CBS and other State institutions.
 - 3.1.7.1 Section 3(2) of the Ordinance states that one of the CBS' duties is to cooperate with State institutions.
 - 3.1.7.2 Section 4 determines the status of the Public Council for Statistics, which serves as a type of liaison between the CBS and its customers.
 - 3.1.7.3 Section 5 of the Ordinance establishes rules for cooperation between the CBS and State institutions with regard to statistical operations that involve addressing the public.
 - 3.1.7.4 Sections 15 and 15a of the Ordinance authorize the CBS to receive information from other State institutions, including information in the possession of any State institution, the confidentiality of which is mandated by law.
 - 3.1.7.5 Section 18a of the Ordinance allows the CBS to share identified information with another State institution following the performance of a cooperative statistical operation, under conditions set forth in that section.
- 3.1.8 The CBS' activity is also grounded on an obligation to protect confidentiality. The CBS may not share with any other entity any identified or identifiable information, other than in accordance with the provisions of Sections 18 and 18a of the Ordinance.
 - 3.1.8.1 The obligation to protect confidentiality is anchored in Sections 17 and 20 of the Ordinance, Section 16 of the Protection of Privacy Law, and Sections 4.2 and 4.4 of the CBS code of ethics.
 - 3.1.8.2 According to Section 20 of the Ordinance, the violation of the obligation to protect confidentiality is a felony for which a three-year prison sentence may be imposed.
- 3.1.9 Mandatory reporting to the CBS is established in Sections 11, 13, and 15 of the Ordinance. The infringement of privacy occasioned by the reporting requirement is counterbalanced by the obligation to protect confidentiality to which the CBS is subject.

3.2 *Office name*

3.2.1 *Details about the functions...*

3.3 Challenges created by the law in view of the organizations' functions

- 3.3.1 Cooperating while maintaining confidentiality, in accordance with the laws that apply to each institution.
- 3.3.2 Assuring a two-way flow of a majority of the information, subject to statutory restrictions.

4. Commitment to quality

Office name and the Central Bureau of Statistics are committed to the quality of the statistical information that they share and that they produce individually or jointly, as defined in the *names of international organizations* document.

4.1 The consultation principle

CBS is the main professional entity with respect to Israel's statistical system, and all government institutions are required by law to consult with it when they engage in statistical operations. However, by virtue of its function, *Office name* is responsible for Israel's statistics. For this reason, and in order to improve working processes and enhance information quality, the organizations agree to consult with each other in accordance with their areas of responsibility and expertise.

4.2 Quality criteria

- 4.2.1 *Preconditions*: statutory and institutional environment, resources, quality management.
- 4.2.2 *Assurance of integrity*: professionalism, transparency, and ethical standards.
- 4.2.3 *Methodological integrity*: concepts and definitions, coverage (completeness of information), sectoral classification/division, and bases for measurement – in accordance with the accepted National Accounts standards and other international standards.
- 4.2.4 *Accuracy and reliability*: source of data, statistical methods, evaluation and verification of interim data and statistical outcomes, updates over time.
- 4.2.5 *Usability*: timeliness, consistency, and procedures and policy regarding updates.
- 4.2.6 *Accessibility* of data and metadata, assistance for users.

4.3 Ongoing quality-control processes

- 4.3.1 A mapping process will be carried out for all cooperative activities that involve the sharing or production of information.
- 4.3.2 For each cooperative activity, a form will be filled out containing the data regarding quality for each of the relevant criteria in a standard table, which will be sent to the organizations' liaison officers.
- 4.3.3 Metadata (relating to description of content, structure, definitions, quality) and para-data (relating to production, collection, and processing) will be attached to the information shared by the organizations, such as will make their nature understandable and to facilitate the evaluation of their quality.
- 4.3.4 Changes in the content of information will be carried out in a coordinated fashion, whether the content was produced cooperatively, or independently by one of the organizations.
- 4.3.5 Cooperative activities will be planned and performed on the basis of a known and agreed schedule.

4.4 Periodic quality control

- 4.4.1 In addition to the ongoing quality-assurance processes, which are intended to satisfy the above-mentioned quality criteria, an annual joint meeting will be held for the purpose of reporting and discussing the quality of information shared and co-produced by the organizations.
- 4.4.2 In the course of this annual activity:
 - 4.4.2.1 The findings of the ongoing quality assessments will be collected and problems that have been raised will be discussed in order to facilitate continual improvement of information quality.
 - 4.4.2.2 The schedules used for the performance of cooperative or shared-interest activities will be reviewed in order to assess the need, if any, to amend them.
 - 4.4.2.3 The Memorandum of Understanding will be reviewed in order to adapt it to changing needs and realities.

4.5 Professional training

In recognition of their commitment to professionalism and in order to discharge their professional functions, *Office name* and the CBS will encourage participation in international courses and seminars, initiate joint training for cooperative projects, and invite colleagues to each other's lectures and training activities.

5. Working relations

5.1 Liaison officers

5.1.1 *Office name* and the CBS maintain ongoing working relations. In addition to direct interaction between the organizations' staff members for purposes of their ongoing work, each organization will appoint a representative who will serve as a liaison officer.

5.1.2 *Office name* liaison officer will be appointed by the

5.1.3 The CBS liaison officer will be appointed by the Deputy Government Statistician.

5.1.4 The liaison officers will meet at least once each quarter for purposes of coordination and updating. They will be responsible for the following actions, in order to maintain and encourage cooperation in accordance with this Memorandum of Understanding:

5.1.4.1 Preparing an annual work-plan for joint initiatives (e.g., scheduling of press releases, setting dates for meetings of permanent working groups, reporting to international organizations, etc.) *until date*

New ventures will be given special attention in order to assure efficient and functional planning and performance. This work-plan will be forwarded to the monitoring committee and to the organizations' executives.

5.1.4.2 Initiating an annual joint encounter during which those involved in the cooperative activity and the organizations' executives will review what has been done with regard to the main items on the previous year's agenda.

5.1.4.3 Dissemination of information about cooperative activity in each liaison officer's organization, including summaries of meetings, reports on international activity, decisions made regarding tangential issues, etc. (The detailed content of this section will be set out in an appendix, to be attached to this Memorandum after the first year of activity.)

5.1.4.4 The liaison officers will update each other regarding changes in matters of relevance to the cooperative activity. Special emphasis will be placed on informing the respective liaisons of any change in working procedures and information content, and of retroactive updates of series, changes in definitions, and changes in schedules for the sharing of information.

5.2 Monitoring Committee

5.2.1 The Monitoring Committee will serve as a steering committee for cooperative activities.

5.2.2 Participants in the Monitoring Committee will be the deputy Government Statistician, *the Director of Office* and the liaison officers.

5.2.3 The Committee will have the authority to approve the joint work-plans.

5.2.4 The liaison officers will update the Monitoring Committee, and the Committee will meet twice annually for this and for other purposes.

5.2.5 The Committee will wield ultimate authority in resolving disputes that arise in the organizations' cooperative work.

5.3 Permanent working groups

Details.....

5.4 Representing the State of Israel

When it is necessary for the State to be represented by representatives of either one or both of the organizations with regard to information that has been co-produced, reportage and participation will be coordinated in the manner set forth in the appendices to this Memorandum.

5.5 Conflict resolution

5.5.1 Nothing in this Memorandum will be construed as being contradictory to the CBS' or *Office name's* decisions and guidelines. If contradictions are found with respect to either organization, the two parties will discuss the amendment of this Memorandum in order to resolve them.

5.5.2 If disputes arise due to different interpretations of the provisions of this Memorandum regarding which the two organizations' liaison officers are unable to reach an agreement, the task of resolving the conflict will be referred to the Monitoring Committee.

In witness whereof, the parties have affixed their signatures:

The name of the manager
Office name

Prof. Danny Pfeffermann
The Director of and Chief Statistician at the CBS

MR16-21 - Twinning activities D.1, D.2, D.3, D.4, D.5 and D.6

Component: Survey Methodology

MR16: Establishment of quality control methods and tools for monitoring field interviewers

MR17: Establishment of quality control methods and tools for monitoring telephone interviewers

MR18: Establishment of a manual of guidelines for interviewers

MR19: Detailed design of at least one web questionnaire

MR20: Guidelines on cognitive aspects of questionnaire and interview design

MR21: Guidelines on how to measure and reduce response burden on enterprises

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List of Abbreviations

CAPI	Computer Aided Personal Interview
CATI	Computer Aided Telephone Interview
CAWI	Computer Aided Web Interview
ICBS	Israel Central Bureau of Statistics
IT	Information Technology (department)
LFS	Labour Force Survey
NSI	National Statistical Institute
PDF	Portable Document Format
QAF	Quality Assessment Framework
SCM	Standard Cost model
SIM	Subscriber Identity Module
VIC	Very Important Companies

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1. Summary description of the Twinning activities

Joint implementation of activities

To implement Component D activities, ICBS has partnered with Statistics Denmark and Statistics Netherlands jointly: Activities D.1, D.4 and Study visit D.5 were implemented with Statistics Netherlands, while activities D.2, D.3 and D.6 were implemented with Statistics Denmark.

Activity D.1 - Management and monitoring of field interviewers

The activity focussed on:

- To review current methods used in management and monitoring of field interviewers
- Discuss quality control methods for monitoring field interviewers
- Elaborate principles and directives for a manual for interviewers.

Activity D.2 - Management and monitoring of telephone interviewers (CATI)

The activity focussed on:

- The review of current methods used in management and monitoring of telephone interviewers
- Discussion of quality control methods for monitoring telephone interviewers
- The elaboration of principles and directives for a manual for interviewers.

Activity D.3 - Design of web-based survey and questionnaire (CAWI)

The activity focussed on:

- The review of current challenges with web-based surveys
- Discussion of methods to be used in web-based surveys and best practices to increase response rate.

During the mission both ICBS and Statistics Denmark presented their experience with electronic reporting, and fruitful discussions were taken.

In particular, a very rough draft to the hotel questionnaire of ICBS was drafted.

The discussions during the mission showed that the hotel questionnaire should not be chosen for the pilot, because too many of the respondents would see a system-to-system solution as preferable. Still, the principles applied and the considerations taken when drafting the hotel questionnaire are rather general, and could generally be re-used or transferred to any other web-questionnaire that ICBS would choose for a pilot study.

Activity D.4 - Cognitive aspects in questionnaire design

The activity focussed on:

- Learning from MS experts about cognitive aspects in questionnaire design, including:
 - The organisation of questionnaire development and the main theoretical considerations guiding questionnaire development at Statistics Netherlands.
 - The Brancato et al. (2006) Handbook of Recommended Practices for Questionnaire Development and Testing in the European Statistical System.
 - The Dutch methodology, as documented in a volume of the so called “Methods series” (a series of documents which describe the validated methods used at Statistics Netherlands) translated in English in 2012.
- The exchange of experiences and ideas on best practices, and the formulation of concrete guidelines for questionnaire design in general and for questionnaires for mixed mode design specifically

- Learning and discussing methodologies frequently used at NSI's and current practices in cognitive interviewing at Statistics Netherlands

Activity D.5 - Study visit on CATI and CAPI

Study visit D.5 provided a complement to the D.1 and D.2 activities in the following topics:

- Managing and monitoring field interviewers
- Managing and monitoring telephone interviewers
- A mix-mode design survey
- Mode effect on weighting and big data
- Training of interviewers
- Quality assurance as a monitoring tool

Activity D.6 - Measuring and reducing response burden

The activity focussed on the presentation and discussion of methods on measuring and reducing response burden, and on how response burden feed into the overall strategy of ICBS (component C). A first estimate of the measurable response burden was already produced during the activity (based on SCM) and grossed up to **40.100 hours - approximately 20 man-years** (seeming underestimated).

2. Background

2.1 CAPI at ICBS

The CAPI interviewing unit of ICBS is part of the general Data Collection division. The interviewing throughout Israel is organized from the headquarters in Jerusalem and two major branches in Tel Aviv (called "South" with approximately 200 interviewers) and Haifa (called "North" with approximately 100 interviewers).

Due to additional requirements following Israel's accession to the OECD the amount of interviewing has, more or less, tripled in Israel. Some new surveys plus expansion of existing surveys, most notably the Labour Force Survey, have exposed ICBS to new interviewing workloads and challenges, the increase in the number of interviewers being one of them.

Response rates are remarkably high, due to the high degree of staff commitment to quality and efficiency, combined with the legal framework in place which makes answering to ICBS's questionnaires compulsory.

Generally, the current survey organization can to a large extent be described as a **stove-pipe** solution, and only to a lesser extent process-oriented, i.e. activities tend to be organized with the same staff performing all task with respect to specific surveys, and not with different and specialized staff for each kinds of expertise.

Organization

Interviewers and supervisors generally work on only one survey. There is, approximately, 1 supervisor per 8-12 interviewers. The current job description of the supervisor is very wide, including pure organizational issues and coaching plus allocation of interviews, but also controlling and training of interviewers.

Sampling is done by the Methodology Department of ICBS. Hereafter the drawn samples are used for data collection, and no current adjustments of the samples are made in case of, for example, capacity problems

Hiring and training

Hiring and training of interviewers is a costly and labor-intensive process in CBS. There is a high level of turn-over – approximately 30 % has left after three months.

Hiring is normally done for only one specific survey, i.e. the overall hiring of interviewers is generally not coordinated. The hiring procedures are initiated on an acute need basis, and are not according to a long-term plan.

Training sessions are run according and planned according to the specific survey, and normally last for five days with use of supervisors as trainers.

Questionnaires and technology

The questionnaires vary in design and layout. Together with varying meanings of codes and varying definitions this indicates that the surveys are generally planned and implemented separately and in an uncoordinated way. Different technologies, concepts and definitions are used for different questionnaires, although constant efforts are systematically made to reach consistency

All in all, around ten surveys are based on personal interviews, CAPI. Except for the Household Expenditure survey which is based on the household filling in tables on paper, all data collection through interviewing is computerized. Two kinds of software are used: Blaise and an internally CBS developed software. Data are transmitted with SIM card installed in the interviewer's computer and the data goes directly to the main database at ICBS Headquarters. On a daily basis, interviewers report by phone or by e-mail to their supervisor, who may monitor the daily progress of the enumeration through his computer.

Indicators for monitoring

ICBS use various indicators, and two of these were discussed during the D1 mission. One has to do with time used for interviews, and the other includes time used "at home", as defined by ICBS – administration, travel time etc.

These indicators are used for the head-quarter's budgeting and planning

2.2 CATI at ICBS

The ICBS collects a substantial share of their statistical data on both households and enterprises through telephone interviewing. Almost all telephone surveys are mandatory for the involved enterprises and households, and response rates are accordingly high (in average above 85 %).

All telephone interviewing is organized and conducted from the Headquarters in Jerusalem. Approximately 160 telephone interviewers are employed. The interviewers work in three shifts, a morning shift, an afternoon shift, and an evening shift where the household interviewing mainly is conducted.

Interviewers typically have the interviewing as their permanent job. The average age of the interviewers is around 62 years. After two years of employment, the interviewers are considered part of the ordinary staff of ICBS, and thus protected by the general rules for state workers.

Interviewer supervisors take part in the shifts, having up to 38 interviewers per supervisor. The supervisor has her/his own "booth", as have the interviewers.

Interviews are conducted with four different computer software of which variations exist. Blaise is one of these software types. Headsets are available, but voluntary to use.

Samples for the surveys are drawn by the Methodological Department of ICBS on basis of the business register or the population register.

With only very few exceptions, the interviewing is conducted for the statistics of the statistical programme of ICBS – i.e. no external customers buy and pay for ICBS interviewing services.

2.3 Web Based Surveys

The ICBS conducts a large number of surveys on Israeli enterprises. However, data collection through the internet is only used to a very limited extent by the ICBS. Besides one small survey, business surveys are conducted either by using paper questionnaires or by telephone interviews.

ICBS and its management are well aware that a switch to electronically reported data from the business sector is inevitable. This could take the form of system-to-system reporting and reporting on web questionnaires through an official portal which fulfills the respondents' need for data security.

The change from paper questionnaires to digital solutions will not come un-expected for the Israeli enterprises. It will be a rather resource-intensive process, and the financial gains for the ICBS will only be mid to long term – in the form of a reduced need for manually entering the data in the ICBS and also because of the possibility of having built-in quality checks in the questionnaire. It is important to note that well-designed web-questionnaires probably will contribute to the quality of the statistics.

After having initially failed, Statistics Denmark's change to electronic web-based forms, was eventually successful only when the necessary skills were gathered in a special interdisciplinary (cross-cutting) unit that had the entire top-level support and backing of the involved parties, including the subject-matter departments, the data collection department, and the IT department.

2.4 Cognitive aspects in questionnaire design

Thus far the ICBS has made only moderate efforts to approach questionnaire design, questionnaire testing and interview approaches and techniques in a scientific manner. There are concerns with regard to potential cognitive effects of questionnaire wording, order of questions, interaction between the interviewer and the interviewee etc. Only recently a staff member has been assigned special responsibility for this area of work. However, what makes this task particularly difficult is that research in order to address possible problems has to be performed without undue interference in ongoing data collection processes.

2.5 Response burden

In ICBS, response rates are high: 85% for household surveys and 95% for establishment/business surveys. These numbers are quite satisfactory. However, the more surveys are conducted; the more response burden is inflicted.

The pivotal point for dealing with response burden in ICBS is the 'Burden Committee' recently appointed by high management. Its tasks were to ensure progress and cross-cutting coordination of initiatives related to burden measurement, including methodological soundness of the measurement approach, as well as guidelines, planning and pursuit of burden reductions in general. More specifically:

- Regarding measurable burden: Elaboration of calculation method (both macro/SCM and micro approach), quality assurance of the necessary data, calculation of the burden measure, and annual update of the calculation.
- Regarding perceived burden: Clarification of the aims of the VIC track and the roles of the coordinators in the VIC work; elaboration of ICBS' objectives and method regarding perceived burdens (development of questionnaire), and calculation.
- Drafting of a data provider policy
- Identification of burden reduction initiatives and prioritisation of recommendations for specific initiatives to ICBS' high management.

Since web-collection is important for response burden, another ICBS committee is relevant in this area: the Data Collection Committee, which has worked a year on digitalisation and has developed a simple reporting solution for the Business Tendency survey. Its tasks are:

- Development of concrete web questionnaires.
- Drafting a general ICBS strategy for the transition to web-based questionnaires.

Some innovative work has been already done in ICBS to assess the burden at the level of the individual enterprises. A project for 'Very Important Companies' has been envisioned also, with the broad aim of improving ICBS' service to the enterprises of highest importance for business statistics.

3. Recommendations

3.1 CAPI recommendations

Organization of the data collection

More process oriented and more flexibility in the working processes and in organization:

- Interviewers and the supervisors should not be specialized in only one survey. They should be trained to work on several surveys for reasons of efficiency and data quality.
- Consider the possibility of allowing interviewers more freedom to do their job. For instance, flexible working hours, instead of working between four and nine o'clock.
- Examine the possibility of lesser number of supervisors to reduce supervisor variance, and therefore the interviewer variance.
- It is highly recommended that the control calls are performed by the central call center, rather than by the supervisors.
- The discussion of organizational issues should involve the top management.

Quality control methods and tools for monitoring interviews

- Interviewers highly appreciate to get feedback on their work: Develop feedback procedures, based on established quality indicators, using a fixed indicator template, e.g. name, definition, variables, standard, action, purpose, presentation, source, period under review (see the Dutch template for indicators).
- The indicators chosen should be:
 - Measurable – i.e. can be measured with the tools available
 - evaluable – i.e. against, for example, an average or a benchmark
 - Interpretable – i.e. they are meaningful for the users.

Manuals for CATI interviewers

The same structure is to be used for both general and specific manuals (to be adapted to ICBS):

- 1) **General manual (e.g. 50-60 pages)**
 - a. About ICBS and confidentiality
 - b. Sample concept (representative frame, sample frame and registers, how to handle the address units etc.)
 - c. How to handle a questionnaire
 - i. Interview technique
 - ii. Interview rules (how to read etc.)
 - iii. Other recommendations
 - d. Approach strategy – handling addresses, people who have moved, getting co-operation, administrative part of the interviewing etc.
 - e. Technical issues (software and lap-top, data transmission etc.)
- 2) **Survey specific guide**
 - a. About the survey

- b. The specific sample
- c. The specific questionnaire
- d. Special approach issues related to this survey
- e. Specific technical issues related to this survey

Other recommendations

Harmonization of questionnaire

Concepts, definitions and meaning of codes in questionnaires of different surveys should be harmonized in order to achieve data of higher quality. The use of different software for different questionnaires is not necessarily a problem, under the condition that the user (interviewer) works with virtually identical questionnaire's interface: same rules, colors, structure, etc. etc.

Longer training, e-training, dedicated trainers

Consider the overall quality effect and cost-effectiveness of the current training system versus a model based on a longer training period, e-Learning, and with professional trainers working exclusively with training.

The Dutch experience is that a 3 months training program, including an introduction day, e-Learning done at home as preparation for 1-2 days of traditional training sessions followed up by "homework", and – later in the process – with both accompanied and un-accompanied test interviewing has proven successful, achieving

- early screening of the candidates
- candidates more easily find out whether the job is interesting for them
- dropout after three months is approximately 10-15 percent, and later, very little.

Methods should be used to encourage interviewers to revisit manuals and maintain their knowledge.

Methodology, sampling and administrative registers

The cooperation between the Data Collection and the Methodological Departments should be strengthened. Data Collection staff members with mathematical background and good knowledge of interview based surveys can contribute to an efficient implementation of surveys.

For example, to fit the available interview capacity and the sample size by “thinning samples”, that is drawing subsamples.

Administrative data files and registers can be used to optimize sampling frames and validate collected data as part of the quality control. This can be done through correlated variables or as mere control questions where the information from the questionnaire is compared to an identical variable from the administrative files.

Certain questions need not be asked if the information exists in the administrative files.

Web-based interviewing

It is recommended for ICBS to consider web-based data collection (CAWI) as part of the interview-based data collection because of the considerably budget savings that could be obtained. This could be as part of an integrated strategy where CAWI plays a smaller or bigger part in the data collection – for example CAWI could be the first wave, followed up by telephone interviewing (CATI) and/or later personal interviewing (CAPI).

The CAWI response rates, based on the Dutch experience, are 25-45% with regular letters being sent out in advance followed by two reminders every two weeks.

3.2 CATI recommendations

Data collection on the web for business and household surveys

- Can increase the response rate (mix-mode)
- Will eliminate the interviewer effect
- Will reduce the response burden and, being based on electronic questionnaire
 - Will facilitate "soft error-checking"
 - Will make pre-fill with earlier reporting possible
 - Could reduce, in a soft way, non-response (example: "Don't know" option not visible when first answering the question, but only allowed in a follow-up question)

The Danish experience shows 50 % of the answers will be provided on the internet (50% by phone).

A joint web entry for all household surveys is recommended – in Denmark it is known as "Your Answer" ("Dit svar"). It is easy to find, and features directions for help support and a FAQ.

New types of competences will be needed in the organization - designers with focus on the respondents' tasks as well as IT persons with focus on the user-friendliness of the system. An implementation plan should be developed.

Response burden and quality evaluation

One of the most important reasons to quality problems in any kind of enterprise or household reporting to statistical authorities has to do with high response burden problems.

Focus on and plan an on-going evaluation (and possible redesign) of permanent surveys, based on experiences from quality surveillance and available indices of the quality.

When implementing new solutions, focus on user-friendliness, and test different solutions. A pilot team for testing questionnaires could be established, involving new internal competences as well as experienced interviewers. The evaluation of the results should be reported to both subject matter units and the management level.

Introductory letters to the interviewed person or the enterprise should also be tested – and different versions compared. The letters should be worded in a direct and positive way, emphasizing the importance of the participation. An example is the change of "*even though you have not been a victim of violence, we would kindly ask you to answer the attached questionnaire*" to "*It is important for us to know what makes you feel safe*".

User friendliness in paper questionnaires

- Use user-friendly design, simple colors and symbols to help focus on the filling task and increase response rate for all questions.
- Special software working with "eye-tracking" is recommended – i.e. an analysis of the human eye's natural focus.
- Use easily understandable language
- Include necessary explanations / instructions in the questionnaire – not in a separate set of instructions.

Quality indicators of telephone interviews

Among the recommended indicators are:

- Unit non-response: total refusals by interviewed person
- Item non-response share (partial non-response)
- The "don't know" share: how often is this option used
- Deviation from register information (variables)

For repeated surveys, specific indicators can be recommended:

- Share of out-liars for burden questions and difficult questions – for example courses and working hours in the LFS, or family travels in the Travel survey
- Share of deviations from previous answers.

Reports should be extracted from the system, regularly during the individual work sessions and after finishing the survey. Reports could be weighted index, individual lists for each indicator - or both.

Efficiency indicators of interviews

Regarding efficiency the following indicators are recommended:

- Duration of the interviews
- Duration of breaks
- Call time
- Extent of calling "empty numbers"

To increase efficiency, fewer systems (than the present four) and more standardized systems for telephone interviewing could be considered. The advantages would be:

- Facilitate goal-oriented training of interviewers
- Easier extraction of more standardized reports on indicators
- Same solutions to the same types of issues and thereby more flexibility for interviewers to switch between on-going surveys.

Interviewer manuals

The challenge with interviewer manuals is to make them useful.

Consider the balance between, on the one side, the quantity and the accuracy, and, on the other side, the realistic usefulness.

The Danish experience is to have a rather short, general introduction to telephone interviewing for newly hired interviewers (2-days session at the introductory training). The general introduction manual is combined with short, goal-oriented manuals about specific surveys. Screen-dumps from the system are used to illustrate difficult problems and indicate solutions.

HR issues – Training, motivating and setting rules

Regarding recruitment of (business) interviewers, Statistics Denmark has positive experience with a two-step approach: First, a large meeting for all applicants, used to align expectations. Then, the best interviewers are hired.

The general training lasts two days and focus on the competences in persuading the interview persons, on the necessary positive attitude to interviewing – called the "psychology of interviewing" and on the interviewer's body language ("smile in the telephone"). The training sessions include inter-active dialogue based on simple case studies and role play.

Shortly thereafter, the new interviewers are introduced to their first survey during a 1-2 hours session and begin their actual work. After one month, there is a follow-up on the individual interviewer's performance, partly based on the indicators.

The MS Experts recommend such fast introduction to the work as it is believed that on-the-job training, when accompanied by the supervisor's attention, is more efficient than longer training sessions based on comprehensive manuals etc.

The MS Experts stress the feedback function of the supervisor to the interviewer – both good and bad results. The supervisor's role is also to find ways to motivate the interviewers, and to show a clear physical and mental presence during the interviewing sessions.

As a supplement, sharing of knowledge and experience could be organized through an official (or unofficial) forum, using the internet options. It proved fruitful and motivating for interviewers to be involved in processes of change.

As another motivating tool, the possibilities to reward the good interviewers should be explored, for example through the number of totally allocated shifts, or attractive shifts, to the individual interviewer.

Regarding the work environment, precise rules must be set regarding the use of mobile phones and internet during the working hours. In Statistics Denmark this is strictly prohibited, while, on the contrary, the use of headsets is mandatory as is believed to increase efficiency.

3.3 Web Questionnaires for business surveys

Switching from paper to web-questionnaires is a resource intensive task. It is important to consider as many aspects of the project as possible, as early as possible.

Organizational issues

The management decision on web-questionnaires must be based on key managers' assessments and recommendations. The top management should do the prioritizing and monitor progress continuously (e.g. monthly reports).

ICBS should establish a single unit to focus on the overall digital task. The units contributing to the cross-cutting project organization must transfer resources to this cross-cutting unit.

An independent project manager referring directly to top-management should be appointed to be responsible for communication between different teams within the cross-cutting project unit.

Questionnaire designers' specific qualifications in electronic interaction are crucial for success. It is not only a questionnaire competence, just as it is not only an IT programming task. Thus it may be necessary to train existing staff, to recruit and/or involve external expertise.

Web-questionnaires easy to fill

The task is to

- create a user-friendly electronic form
- focus on graphics
- focus on the logical structure and the respondent's natural process when filling in the questionnaire.

Getting data from respondents is the first objective, not being over-critical with respect to quality. It's preferable to get data on 99 out of 100 variables, rather than reject everything because of an error. Quality can be further strengthened later.

Develop inter-active assistance, pre-filling with previous reports and soft editing in a second step. It is vital for success that you do not initially develop a questionnaire that does it all. It's already a big challenge to make a simple electronic form that respondents find easy to fill in.

Start with a simple (short) survey for pilot:

- Consider the respondents' IT readiness,
- Do not choose a too small survey (number of respondents)
- Ensure success appears in the first project.

The trend is that more and more respondents prefer electronic user-friendly solutions, which they can control.

At start, keep it simple and limit the number of (too many) seemingly attractive functionalities, since too many checks, sums etc. will endanger the user-friendliness of the web-questionnaire. As an example, consider soft and hard validations – soft validations are preferable at the beginning – because the focus must be on user-friendliness.

Testing is important at all stages and organizational levels: design, developer, end-user (enterprises), acceptance, general management level (project manager).

Minimize response burden and maximize quality

Only a few (as possible) clicks (for the end-user) should get the answering process started.

Too much reading distracts and irritates the respondents, so instructions should be directly relevant to the information on screen. Other information, e.g. definitions, should be available upon clicks.

The strongest data, i.e. the very most important data, which is often also the data of the highest quality (because it is known to the management of the enterprise), should be placed up front. Other parts of the questionnaire could then be tested against these high quality data. Generally, the sequencing of the questionnaire's questions should as far as possible reflect what the respondents consider most relevant and important.

It is recommended to use simple graphics to support the communication (**bold**, *italic* etc.). As for filling in the questionnaire, vertical scrolling is generally accepted by respondents when lacking a bit of space – while horizontal scrolling should be avoided.

Phases to create a questionnaire

In order to establish clarity about decisions and management, the questionnaire could be “owned” by the cross-cutting project unit during the development of the web-questionnaire:

- The subject matter unit will give all the input they can
- The project unit will ensure the homogeneity, general quality and rules

In Statistics Denmark, the project unit consisted of 3 designers with expertise in web-questionnaires and interaction with respondents, and 3 IT developers. It is recommended to ICBS to operate with a project unit that is not considerably smaller or larger than a total of 6 staff with the expertise described above.

A plan to create, test and produce web-questionnaires is recommended, e.g.:

Phase	Explanation	Who is responsible
1	The design team has a meeting, to discuss the questionnaire in general and its specific functionality.	Designer
2	Startup meeting with users: the design team presents ideas for questionnaire design and functionality and receives comments.	Designer
3	Typically the developers create 4 environments - developer environment, test environment, preproduction environment and production environment. The databases are created in the developer and test environment.	Developer
4	The designers create the first version of the questionnaire. In this version there is no functionality behind the buttons etc.	Designer
5	Design meeting with the users, where the first version is presented for users' comments. It's the last chance for the users to give input	Designer
6	Due to security reasons, the users of the Database are created before the questionnaire is accessible.	Developer
7	A developer produce the second version of the questionnaire, with functionality behind the buttons etc.	Developer
8	A designer (different from the one who made the first version) makes a test of the questionnaire	Designer
9	The developer corrects the errors detected in previous phase.	Developer
10	The questionnaire is fully tested by an internal user, that have experience in testing IT-systems	Designer
11	The developer corrects the errors detected in previous phase	Developer
12	The database are created in the preproduction environment	Developer
13	The questionnaire is fully tested by an external user, who is typically an employee in a company that takes part in the survey. The questionnaire is tested in 2-3 companies	Designer
14	To improve the code of the questionnaire and ensure quality, another developer looks through the entire code.	Developer
15	The developer corrects the errors detected in the previous two phases	Developer
16	The designer shows the questionnaire to the users so they see the final result	Designer
17	The project manager run an acceptance test of the questionnaire, to ensure that data from the questionnaire fields are saved in the correct variable of the database	Project manager
18	The developer corrects the errors detected in previous phase	Developer
19	The database are created in the production environment	Developer
20	The designer makes the last update of the documentation according to the final version of the questionnaire	Designer
21	Approximately 2-3 weeks after the companies has started to use the questionnaire, the designer have a short meeting with the users to hear about their experience so far	Designer

3.4 Cognitive Aspects of Questionnaire Design

Develop Data Collection Strategy and Guidelines for Questionnaire Design

To achieve both high quality and standardisation, ICBS should 1) develop its own set of guidelines for questionnaire design and evaluation and 2) have the use and maintenance of these guidelines supported by the Top Management and 3) facilitate the way questionnaire development is organised.

These guidelines should be part of a general **Data Collection Strategy** that acknowledges that data collection decisions affect data quality, the costs for the survey organisation and the costs for the respondents.

The strategic plan for the Top Management should specify

- the objectives of Guidelines for questionnaire design, including the benefits: efficiency, response burden reductions, transparency, data quality
- the Guidelines' connection to the general Data Collection strategy and to the Data Providers Policy
- how the Guidelines will be used
- the ownership and maintenance of the Guidelines
- the necessary support from Top Management and all involved departments
- the ICBS internal communication during development and dissemination of the guidelines (as many parties are involved in questionnaire design or at least will be affected by changes in practices)

The guidelines should focus on mixed mode related issues and on the development of web-questionnaires, based on known experience:

- Use the Statistics Netherlands' "Questionnaire Development" guide
- Use Eurostat "Handbook of Recommended Practices for Questionnaire Development and Testing".
- Involve expertise from all stakeholders at drafting stage – i.e. Survey Department, Methodological Unit, IT Department, and Subject Matter Units in order to get relevant input and establish consensus.

Organisational issues

Consider setting a separate unit (in the Survey Department) specialized in Questionnaire Design and Testing.

Coordinate the research conducted into data collections methodology, e.g. coordinated sets of experiments in various surveys programs.

The field of data collection methodology changes quickly due to technological changes (e.g. smartphones used in web surveys or as a tool to collect geo-locations). Updating data collection methodology takes time while the day-to-day deadlines must be met. Therefore resources should be structurally set aside to acquire and share new knowledge.

In the standard development processes of questionnaires (new ones or revisions) cognitive pre-testing/evaluation should become a frequent tool used at ICBS. Taking some resources from the current field testing is a good option (do one or two rounds of small scale cognitive pre-testing before the large scale field test).

In the course of the implementation of a questionnaire much quality information is gathered (e.g. level and timeliness of responses, interviewer satisfaction, experiences of help desk staff and data analysts). Plan for structured feedback procedures (i.e. after each wave of a survey, or after every three years or so.)

Web-questionnaire pilot

Use the development of a web-questionnaire (e.g. Hotels survey) as a *case* for the development of ICBS Guidelines for Questionnaire Development and Pre-Testing:

- See if the guidelines for questionnaire design for web-surveys work in practice
- Gain more experiences with cognitive testing.

3.5 Measuring and reducing response burden

MR21 should be achieved two-fold:

- A. Preparation and adoption of guidelines on how to measure and reduce response burden on enterprises. This will be coordinated by the Burden Committee.
- B. Preparation and adoption of a strategy for transition of business data collection to web-based questionnaires. This will be coordinated by the Data Collection Committee.

Response burden strategic objectives and interrelations

- ICBS is well on the way to implementing response burden measurement. However the sensitivity and usability of the current approach could be challenged and a simpler and more interpretable approach should be tested. It is recommended to complete the work with a baseline measurement ('top-down') in line with the principles of the SCM and subsequently update the measurement annually.
- ISCB should develop a robust strategy for changing its collection of business data to digital means through the web. This strategy should comply with ICBS security/confidentiality policy and ICBS should decide whether to use the government portal for forms, or not.
- A 'data provider's policy' should regulate ICBS interaction with enterprises. Internally, it would define a standardized modus operandi across surveys. Externally, it could define ICBS' relations with enterprises in a clear and transparent way, adjusting expectations and maintaining the reputation of ICBS.
- There is an interface with component C regarding strategic planning: *Data security and data confidentiality*. Solutions to these issues precondition a change from analogue (interviews and paper questionnaires) to digitalized data collection (i.e. on-line questionnaires and system-to-system solutions).
- There is an interface with development of web-based questionnaires (MR.19). A transition to digital questionnaires is a big task and involves understanding of digital interactions.

Organizational issues

Internally in ICBS

The burden initiatives raise new competence/training needs, especially, the VIC track if implemented:

- additional competences for coordinators
- better understanding of statistical needs and questionnaires in the statistical domains
- good knowledge of different economic sectors.

Involvement of external stakeholders

ICBS is encouraged to establish a forum where representatives of the Israeli business community are involved in their role as data providers and bring forward their views (perceptions, criticism, complaints, ideas, proposals etc.) in an organised manner.

Communication and transparency

Results of the baseline measurement and subsequent annual updates should be published, e.g. in the statistical program (per survey) and in the respective quality declarations – and perhaps even in an annual news release. Similarly, main burden reduction initiatives could be communicated externally.

Measurable/actual burden

The two approaches for measuring the actual burden – "bottom-up" and "top-down" - are complementary, not conflicting, if based on the same definitions, observations and registrations. The ICBS should decide whether to focus mainly on the *level* of the burden or *development over time*.

Macro-level

- A consolidated list of surveys and questionnaires need to be drawn up, i.e. the "units of observation" (the rows in the table) for the burden measurement.
- Ensured the correct administrative activities in the enterprises are included in the time measurement (by the SCM):
 - *Include* the time it takes for the enterprises 1) to gather the statistical information *and* 2) fill in the questionnaire or be interviewed. (Special attention should be paid to filter questions which time to fill could vary considerably.) Clarify it on the questionnaire.
 - *Do not include* time used in 1) the re-contacting/validation in the measurement and 2) time usage associated with refusal.
- Improve accuracy of the current time use estimation. Missing data should be provided, outliers be excluded/disregarded, and the plausibility of the averages be subject to expert assessment. Implausible averages should be replaced by expert estimates or time use observations from separate interviews. Be realistic with "small tasks"- "nothing takes only five minutes" in reality.
- Consider distinguishing time estimates for small, medium and large enterprises.
- Full samples should be used as the population, not just those responding.
- Solve ICBS problems regarding the *enterprise_number*.
- Averages salaries per occupation are needed – not average salaries per ISIC activity.
- The burden should be measured in time-usage (man-years) as well as in costs (NIS).
- The measuring system must keep structural elements fixed so that changes to the measure between years only reflect the changes following from *burden reduction initiatives*.

Communicable decisions

The burden value for each enterprise could serve to identify enterprises subject to "disproportionate burden". However, it may be difficult to communicate externally how decisions to include/exclude enterprises in surveys are made on the basis of such an index. This could call for a more simplified – but *communicable* – approach with simple and transparent rules.

ICBS is encouraged to continue its work with the index, and especially to test its sensitivity to adjustments of the scales (i.e. whether it will in fact identify the same enterprises if the scales are modified). But also ICBS is suggested to consider *simpler approaches* to burden measures at enterprise level and with a defined unit of measure, like e.g. "annual burden measured in NIS divided by annual turnover" or "annual burden measured in time used divided by employment".

Perceived burden and respondent satisfaction

ICBS is recommended to measure the perceived burden, e.g. in the form of a simple "respondent satisfaction index" – based on voluntary questions in the survey forms and focusing on aspects ICBS can actively influence.

Response burden reduction

The VIC track

The "VIC track" seems ambitious and visionary. However, the benefit of the project may actually be bigger for the *quality of the statistics* than for the burden, and probably the *perceived* burden will primarily be reduced. Project's objectives and criteria for VIC will need clarification:

The criteria for delineating VICs need to be discussed and decided. It could be defined on the basis of e.g. 1) number of questionnaires, 2) size of enterprises (overall and in different industries), 3) complexity/dynamism of enterprises, 4) difficulties in responding, 5) complaints from enterprises, and/or 6) cross-cutting importance for several surveys. A limit of three questionnaires seems too low.

A one year pilot project should gather experience on a smaller sample:

- It is clearly recommended to "think big, but start small", i.e. to start with a pilot phase of perhaps one year where experience - not least with regard to the resources and skills needed for the VIC work - could be gained on the basis of work with e.g. 25 enterprises.
- Based on such experience a suggestion could be made to ICBS' top management for a larger scale implementation. However, a large scale implementation could be quite costly, so business-case consideration will be very important here.

Transition to Web collection, Re-use of information and feedback to Business Register

- A transition from paper-based to digital questionnaires involves understanding of digital interaction, including the use of pre-filled data, soft validations, integrated instructions, and survey specific help-desk functions on ICBS' website in order to support the respondents
- Such transition should involve a thorough examination of existing questionnaires with a view to identify "need to know vs. nice to know" questions and the elimination of superfluous and overlapping/duplicate questions.

The discussions revealed unexplored possibilities for increased reuse of existing information – especially of data from the Business Register (e.g. employment figures) – with a view to discontinuing collection of these data via surveys.

- Moreover, consider whether data items at enterprise level regarding response burden (e.g. number of surveys) could also be fed back to the business register and perhaps be used for stratification and sampling.

Burden reduction catalogue

A "catalogue" with all known possible specific initiatives related to reduction of the measurable or perceived burden (optimization of samples, reductions to specific questionnaires, improvement of survey instructions etc.) could be drawn up by the Burden Committee. From this catalogue initiatives could be selected and drawn up in annual action plans.

4. Implementation of the mandatory results, sources and methods

MR16: Establishment of quality control methods and tools for monitoring field interviewers

Description of methods and tools

The Twinning Project increased awareness in the use of measurable quality indices. Alongside quantitative measurements in use at ICBS, to measure the progress of the survey and the interviewer's effectiveness, measurements of interviewer's work quality were introduced.

The approach was based on Netherlands experience of cooperation and coordination of expectations with the interviewers, expressed by an "agreement" between the interviewer and his manager, where measurements of effectiveness and quality indices were introduced. In addition, the interviewer's expectations were defined in terms of work procedures, shifts, behavior and representation.

The agreement was used for the first time with interviewers of the Social Survey. In light of the feedback we received, we made revisions and a second test was run with the Longitudinal Survey.

Evaluation of the results

The Social Survey is a core survey of ICBS. Parameters were defined to measure the quantitative and qualitative aspects of the work of interviewers and meetings were held with the interviewers as the agreement was made. This first pilot was carried out at the beginning of Q3 in 2014, to be assessed after six months. Thus, we still cannot evaluate the impact of the agreement on the interviewers' work.

Following the success of the first agreement, a similar agreement was introduced, after making improvements, for the Longitudinal Survey in 11/2014.

Future work, including estimated time plan

After receiving feedback from the two pilots, a similar agreement will be implemented for all field surveys, with the relevant parameters for each survey. The plan is to make an ongoing annual evaluation with the interviewers. This will take place during the year 2015.

MR17: Establishment of quality control methods and tools for monitoring telephone interviewers

Description of methods and tools

Prior to the Twinning Project, we tested quality by listening at distance to interviews; we used a standard structure for the accompaniment report, tailored to each survey, with no organized and systematic quality control. Subsequently, the new accompaniment report had control parameters with a weight and a grade, to be filled in a form by the accompanier. A threshold score was also defined, to trigger a course of action: a score under the threshold will result in an additional accompaniment within a specified time period.

In addition, three measurable qualitative variables were selected and goals for improvement were defined in the Business Tendency Survey. This was carried out in cooperation with the data collection personnel and tested for three months, plus another three months.

Evaluation of the results

After a number of uses, it was decided to adopt the new form for the monthly Labour Force Survey.

The experiment of the Business Tendency Survey revealed success in some of the indices that were examined, while not in others. We are examining other variables to be defined as targets for improvement, and we are continuing to track improvements in the variables that were defined in the first round of the experiment.

Future work, including estimated time plan

An accompaniment form with performance scores will be adopted in additional telephone surveys. Variables for improvement in specific surveys will be defined. This was already introduced in the Job Vacancy Survey and in the future, it will be introduced for other surveys in a similar format.

MR18: Establishment of a manual of guidelines for interviewers

Description of methods and tools

A generic manual for Family Surveys for the field interviewer and a generic manual for Business Surveys by telephone were written.

Evaluation of the results

The first use of the generic manual was made in training new field interviewers. Afterwards, updates were made in light of the training. The manual is now ready for Family Survey field interviewers. The first version for the business survey interviewer and the specific guide first version were written

Future work, including estimated time plan

A survey-specific manual, in accordance with the outlines of the generic manual and with the same structure, will be written and will be used in the training of field interviewers in 2015. In 2015, a manual will be used for the business interviewers and then we will make corrections before writing a specific manual for the Business Survey. These manuals will form the basis for the future development of remote training (e-learning).

MR19: Detailed design of at least one web questionnaire

Description of methods and tools

An online questionnaire was designed for the Hotels Survey, based on the rationale learned in the Twinning Project. However, additional solutions for transferring data in that survey were proposed, and finally, a system-to-system solution was adopted instead.

Evaluation of the results

From the point of view of the users, it was found that filling out this survey online did not improve the work processes. We are examining other candidate surveys to implement online questionnaires.

Future work, including estimated time plan

The plan is to develop an online business questionnaire during 2015, for a new survey. The system-to-system solution for the Hotels Survey will be examined in terms of budgetary costs and implementation with regard to users. The main issue we're facing for now is information security. The organization needs to improve its systems in order to provide higher security, and until this is achieved, it won't be possible to go forward. There is an organizational program to upgrade the systems security in 2015.

MR20: Guidelines on cognitive aspects of questionnaire and interview design

Description of methods and tools

A cognitive manual is being written based on the translation of the manual of the Netherlands.

Evaluation of the results

The writing process is at its beginning. It was decided to have two core chapters and to complete the manual with relevant examples from questionnaires in Israel.

Future work, including estimated time plan

A project leader was designated who will be responsible for completing a full version of the manual. The first complete version will be finished during the first quarter of 2015.

MR21: Guidelines on how to measure and reduce response burden on enterprises

Description of methods and tools

Following the Twinning Project, an update of the response burden system was carried out with the 2013 samples. A calculation was performed for the first time based on the Standard Cost Model, and it was presented to the Project's RTA:

- The cost partly includes the time it takes for the enterprises 1) to gather the statistical information and 2) to fill in the questionnaire or participate in the interview, and
- The cost does not include 1) the re-contacting/validation in the measurement and 2) the time usage associated with refusal.
- ICBS problems with the *enterprise_number* are being dealt with internally, together with the involved ICBS units.
- Averages salaries per occupation are used – and not average salaries per ISIC activity.

In addition, we improved the statistical calculation that was designed, and also started to define companies that would receive VIC treatment, based on various calculations of the response burden. We are working on defining the type of treatment companies will receive on the VIC track.

Evaluation of the results

For the first time a SCM cost calculation of the response burden was performed in Israel. The Twinning Project promoted the treatment of the response burden on businesses in Israel and a committee was established in the ICBS to deal with the issue, both in terms of sampling and in term of integration of samples. ICBS recognize the computations of the response burden performed and the parties involved within the organization collaborate.

Future work, including estimated time plan

Some of the objectives planned for the continuation of this important project are:

- Improving the interface between the response burden system and the Business Register,
- Improving the interface between the response burden in various surveys and the response burden system, and
- Standardizing the response burden variables in the various surveys, as well as completing the missing values.
- Measuring burden in time-usage (man-years) as well as in monetary costs (NIS).
- A top-management decision should be made about the publication of the results of the baseline measurement (e.g. made in 2013) and subsequent annual updates of the response burden, in the statistical program (per survey) and in the respective quality declarations.
- Measuring the perceived burden, e.g. in the form of a simple "respondent satisfaction index" based on voluntary questions in the survey forms and focusing on aspects ICBS can actively influence should be considered, once the cost for this activity has been evaluated

Subjects upon which we have started to work and more work is necessary in the coming years include: Determining the criteria for defining VIC companies, defining the type of treatment of companies in the VIC track.

5. Impact

The Twinning project had impact of issues beyond the achievement of the predefined MR's:

Improving quality of data collection

Quality control

The goal of the project was to raise awareness about data quality. Currently, in light of the project, there is an emphasis on quality control in the work of data collection, both in the field and via telephone.

Harmonization of concepts, definitions and meaning of codes in questionnaires

This is been implemented (partly) for new surveys. We plan to start with harmonization of statuses in the future.

Training and e-learning

- The utilization of computerized training tools prompted the creation of an electronic guide for the work of the interviewer, using Google docs to send training exercises in preparation for interviewer training. Needed infrastructure was set to support the upgraded training process combining digital and in-person training.
- The top level management has approved going toward e-learning. We have shortened our training by using the new generic guide

CAWI

The understanding of the need to promote business-related surveys in the direction of an online nature has permeated ICBS. Various options for implementing online surveys are being explored, subject to the constraints of maintaining data security. A feasibility study of an online questionnaire with companies was undertaken. There was positive feedback from the businesses and an additional feasibility study is planned within the realm of tourism.

ICBS management is promoting a solution of data security issues that would enable online data collection through the internet.

Specific changes already occurred:

- A letter is used in household surveys to inform respondents about the web-solution.
- Top-management approval is sought to develop new types of competences with focus on the respondents' tasks and user-friendliness.

Collection management

A maximum number of calling per each sampled unit has been defined in CATI.

We set an annual planning of expected investigations per month. We are complementing the definitions of breaks in day and night shifts.

Data provider policy

The principles, practices and overarching objectives for ICBS' interaction with enterprises will be formulated in a "data provider's policy".

We are seeking a top-management decision to establish a forum where representatives of the Israeli business community are involved in their role as data providers and bring their views.

6. Sustainability

Quality control, with an emphasis on the quality of data collection will continue in the future, through the use of both a "contract" with the interviewers, and a qualitative measurement of work product, and the implementation of quality control in additional surveys.

Training procedures are reviewed and will undergo changes that will be based on a brief general training process, e- learning, and survey- specific learning.

The future manuals will allow for the learning materials to be delivered to the interviewers via the Internet, including the administration of remote testing.

Digital manuals will be included in interviewers' computers to serve as a tool to assist in their training as well as in the process of their ongoing work.

The Surveys department will present ICBS management with a strategic plan for the gradual transfer of business surveys to the Internet, assuming that the issue of data security has been solved.

Upon the Project's conclusion a cognitive guide will be presented to employees as a working tool for building new questionnaires and evaluating existing questionnaires. The Surveys department will continue to refine the measurement of response burden on businesses with the aim to reduce it.

7. Conclusions

It is being thought that the overall changes in the Surveys department culture that occurred in the framework of the twinning project, and as a result of further internal discussions, were crucial to the initialization of a modernization trend that affected all aspects of data collection.

List of Annexes related to MR16-21

Annex Number	Annex name and description	Comment
1	The new Agreement between the field interviewer and his manager in the Long Term Survey. Rules and principles implemented in 2014.	2 pages, Hebrew
2-4	Annex 2: Interviewer Supervision (Surveillance) Report. The new accompaniment report for quality control of telephone interviewers work, with rating for each index, and general rating score. Annex 3 and 4: Summary Report on Supervision of Interviewers in the Human Resources (Lfs) telephone survey January 2014 and May-June 2014 respectively. The use of the new report (annex 2) in two pilot study and the summary of the findings.	3 pages, Hebrew 2 pages, Hebrew 2 pages, Hebrew
5	Summary of Quality Control Measures in two surveys: Available Jobs Survey and Business Tendency Survey. Three quality-control variables were defined with improvement goals in surveys involving supervisors and interviewers. After three months, a summary report was written showing an improvement of two out of the three variables.	5 pages, Hebrew
6	Quality Control in business surveys by collection method . A review of quality controls variables which need to be implemented during data collection in Business Surveys, according to the collection method used.	14 pages, Hebrew
7	Generic manual for Business Surveys Interviewers To be used in training Business Surveys interviewers – Version I	31 pages, Hebrew
8	A generic manual for interviewers in Family Surveys. This manual was used in training new interviewers in 2014.	68 pages, Hebrew
9	Social Survey Interviewer Guide . A specific guide for the Social Survey, written according to the structure of the generic manual.	129 pages, Hebrew
10-12	Request to management for the development of a Tourism web-questionnaire Tourism paper questionnaire (in English). Preliminary design of a Tourism web-questionnaire	7 pages, Hebrew 8 pages 6 pages
13	Cognitive aspects in questionnaire design A manual for questionnaire design	69 pages, Hebrew
14	Methodological VIC Policy Document Preliminary strategic guide for handling VIC companies	11 pages, Hebrew
15	SCM calculation. Measurement of the burden according to SCM model	Excel spreadsheet

MR22-24 - Twinning activities E1, E2, E3, E4.1, E5, and E6.2

MR22. Drafting of an ICBS dissemination and communication strategy

MR23. Establishment of mechanisms for continuous monitoring of user satisfaction with the website

MR24. Establishment of a plan for redesigning the website, including an improved search function

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List of Abbreviations

API	Application Programming Interface
BPM	Business Process Model
CoP	European Statistical Code of Practice
DDI	Data Documentation Initiative
EU	European Union
ES	European Statistics
FAQ	Frequently Asked Questions
GSBPM	Generic Statistical Business Process Model
GSIM	Generic Statistical Information Model
ICBS	Israel Central Bureau of Statistics
IMF	International Monetary Fund
IT	Information Technology (department)
NSI	National Statistical Institute
NSS	National Statistical System
SD	Statistics Denmark
SDDS	System of Data Dissemination Standards
SDMX	Standard for Data and Metadata Exchange
SIMS	Single Integrated Metadata Structure
SMS	Statistical Metadata System
UN	United Nations

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1. Summary description of the Twinning activities

1.1 Study Visit on Dissemination

The aim of the visit was to expose the Israeli experts to the experience accumulated in Statistics Denmark, in their recent website upgrade process.

The Danish web dissemination strategy was presented together with the guiding principles for website operation and web-dissemination, based on a systematic and goal oriented development of infrastructures, products and tools.

ICBS experts shared with Denmark the overall approach consisting of setting mechanisms and tools to support a coherent and consistent website, including the use of a single database for all web-products and along with a centralized management of the metadata by the dissemination unit.

In Denmark, the web-dissemination strategy is derived from the overall strategy of the Danish office: user-oriented production and dissemination. The culture of consulting with users, addressing users' needs and providing them with statistics fit to uses is to be further developed in ICBS.

It seemed that Statistics Denmark (SD) and ICBS share the same challenges, and SD suggested solutions and guiding principles for website operation.

1.2 Assessment of current situation of dissemination and website

Three major topics were discussed during the E2 activity. These were the renewal of the CBS website, the dissemination strategy, and metadata

At time the activity was held, ICBS was in the middle of starting a complete renewal of www.cbs.gov.il. The renewal includes the information architecture / website navigation, the technical infrastructure, and the organization of work / work share between IT, Dissemination and subject matter divisions. A new structure of the topics (subject areas) was in preparation, with objective to improve usability, user orientation and clarity of the new website.

The discussions during the E2 activity focused on Statistics Denmark's experiences with these processes and ICBS planning for the new website, as put forward by ICBS private consultant for the new website. From ICBS side, it was clear that responsibilities and workflows would change as a result of the website renewal, although the implementation of this change in the organization was not clear yet. ICBS and Statistics Denmark exchanged experience regarding organization of work in relation to uploading, editing content and data on the websites. From the Danish experience, neither IT nor Dissemination has the organizational influence to change or interfere with the way that the subject matter divisions work. If the website / platform do require new ways of work, the implementation must have strong and explicit support from senior management.

1.3 & 1.4: Workshop on user satisfaction & adaptation of ESTP training course

The E3 and E4 activities had two purposes:

- To discuss and conclude on the measuring user satisfaction and finding ways of improving it (E3; MR23)
- To introduce EU and UN requirements for NSIs in fulfilling their responsibility in disseminating official statistics and the best practice: what constitutes a high quality website for official statistics (E4; MR22).

1.5: Development of dissemination strategy

E5 activity focused mainly on:

- **A user oriented dissemination policy;** identifying needs; setting priorities; follow-up methodology regarding the measurement of users' satisfaction with the website.
- A single access-point for all information items and services and for all users
- ICBS website as the main dissemination center of all information authorized to be published

1.6 Development of a meta-data system

Two activities were devoted to the development of a metadata system in ICBS.

Activity E4.1

The objectives of E4.1 were:

- to introduce ICBS staff to the methodology of building a metadata system; *and*
- to define a work plan and milestones for the development of a metadata system for ICBS.

A methodology for building a metadata system

The overall methodology proposed was the Business Process Management, focusing on the „as-is” and „to-be” states, with each sub-process examined for its contribution to the value of the final product delivered to the user/customer.

Since metadata is connected to all processes, including data used and produced, quality and process management, processes, quality and metadata are seen as a whole. By BPM, metadata should create a value chain for internal and external users and contribute to cost-effective production.

The overall current state with regard to metadata („as-is”) is twofold: the environment (legal, IT, users' needs, and standards) and the activities (current strategy, processes and technology).

Within the BPM framework, enterprise architecture methodology⁽³²⁾ was proposed to decide on how to move from "stove pipes" to common processes, common metadata applications, common subject matter applications and common dissemination applications where data and applications can be reused across the organisation.

A work plan for the development of a metadata system

Five primary functions³³ were chosen as ICBS goals for metadata as a result of a group discussion. A preliminary work-plan was agreed upon.

- Managing communication with end-users and gathering of user feedback.
- Disseminating statistical information to end users. End users need reliable metadata for searching, navigation, and interpretation of data.
- Improving the quality of statistical data and transparency of methodologies.
- Managing methodological activities, standardizing and documenting concept definitions and classifications.
- Managing, unifying and standardizing workflows and processes; Documenting processes.

³² Following the method on integration of strategies by Ross et al (2006). *Enterprise Architecture as Strategy. Creating a Foundation for Business Execution*

³³ [Common Metadata Framework Part A Statistical Metadata in a Corporate Context](#), UN

Activity E6.2

The objectives were:

- Development of the part of ICBS' strategy plan regarding metadata and quality.
- Discussions of ICBS' specific need regarding choice of data formats and corresponding software solutions for a central metadata system.

The importance, advantages and functionalities for internal and external use, of a statistical metadata system (SMS) centrally integrated was demonstrated, using Colectica software.

Live demonstration of the SMS software functionalities was used to::

- build metadata for a simple questionnaire with reuse of code lists and variables
- build metadata for a simple data-structure (micro-data from survey/administrative data)
- build an aggregated dataset using N-cube, with reuse of variables and code lists from micro-level.
- support work on quality declarations with reuse of statistical concepts and with integration into GSBPM.

The importance of DDI based documentation, the relations between SDMX and DDI, the risks in using the only commercial application of DDI, alternatives and costs were discussed. Software permissions could be used to enforce centralised standardization and harmonization of concepts, variables etc.

A maturity model was presented to describe the short, middle and long term perspectives of a metadata driven statistical production. Recommendations on methodology, processes, metadata strategy and quality were formulated, and the roadmap from Activity E4.1 improved.

2. Background

The ICBS website was first launched in 1996 and was renovated in 2005. Over the years, it went through additional adjustments and changes, mainly to improve its usability and user-friendliness. However, with growing numbers and heterogeneity of clientele, a systematic review was required, in the framework of developing an overall ICBS communication strategy with the website in the centre.

For the present, the structure of the website and the organization of its content do not follow accepted standards and practices. Some of the main problems are:

- The site and the data structure follow the ICBS organizational structure, rather than a logic of content organization fit for use
- Consequently, statistics on the same topic may appear in totally unrelated locations and formats
- The ICBS data warehouse is not connected to the website
- Metadata is not systematically presented
- The search mechanisms are insufficient, making some data difficult to find
- Separate and unsynchronized manual updating procedures result in inconsistencies
- Data presentation is old fashioned and uninviting

Therefore, because of its importance for the future of ICBS, the development of an overall dissemination and communication strategy and the role of the website in that strategy were defined as objectives of E component.

Secondly, specific consultancy was requested for the redesign of ICBS website:

- An analysis of the current situation,
- Analysis of users' needs,

- Decisions about website features that would meet users' needs,
- Linkage of the data warehouse to the website,
- Improving search mechanisms,
- Procedures for easy and automated updating

However, due to a postponement of the Twinning project, at the time it started an external consultant was already preparing the tender for the company in charge of the ICBS website redesign. This caused some discrepancies in timing through the various activities.

Another unexpected development in the Twinning project arose during the course of component E activities, while dealing with disseminated metadata:

Although metadata exists everywhere in ICBS, generally, it is produced independently for each purpose or destination using partial and non-formal guidelines. In some specific domains, metadata production is much more standardized but there is no reuse of metadata across domains or over time and metadata quality is only self-assessed by subject units or individuals.

Component E activities were used to assess ICBS current situation with respect to metadata, with the participation of all relevant units, yielding the following picture:

A (non-exhaustive) list of already taken metadata initiatives in ICBS was drawn:

1. Catalogue of questions in surveys.
2. Glossary of concepts.
3. Thesaurus (under construction, for the benefit of the new website).
4. Catalogue of code lists for programmers.
5. Catalogue of variables for programmers.
6. First metadata prepared for SDMX data exchanges with international organizations
7. Introductory sections in publication; chapters in the Annual Abstract; subject matter web page in the website.
8. Ad hoc metadata produced for international organizations, for example, metadata for SDDS series, published in IMF website.
9. All kinds of methodological documents created and published by the subject matter and methodology units, and at their responsibility.

The following challenges were identified:

1. With the public at large: Statistical illiteracy, difficulties to know what data to use and where to find it in web-site, incomplete and not systematic metadata in site and in publications, users' needs only roughly assessed.
2. With the organization: transmission of data to international organizations is not cost-effective, (web services and use of SDMX are partial); the production of metadata is perceived as time consuming by subject matter units; there is a lack of common guidelines for its production; staff is not acquainted with standards (DDI, SDMX). Few cross cutting processes are implemented and units are used to work autonomously (stove-pipes).
3. With metadata content: no metadata at process level for systematic planning, methodology, management and integration; metadata production is not integrated with processes; there is a lack of harmonization of standards and metadata across departments; De facto ICBS metadata (parent variables, dictionaries, reference metadata) do not play together with and international standards (DDI, SDMX) in general.
4. Although willing to set up a common integrated metadata system, ICBS is well aware of the challenges in maintaining such metadata updated and active without it being perceived as an administrative burden on the organization.

As a result of the metadata issues presented above, a third objective was identified for component E: the development of a general framework regarding quality declarations and other metadata for dissemination and internal uses.

3. Recommendations

MR22. Drafting of an ICBS dissemination and communication strategy

- **An approved dissemination strategy based on international requirements should be developed.**
- The approved dissemination strategy should be **the driver / deterministic part of the web renewal project** –not the other way around.
- **Organizational issues** are more important than technology.
- **Initiate metadata project.** Projects on quality, processes and part of dissemination could be integrated
- **Metadata as integral component of products, suited to type of user** (layman/professional). Today, the management of metadata in the CBS (for data series only) is performed by the subject units. For coherence purposes, it is suggested that it should be managed by the dissemination unit.

MR23. Establishment of mechanisms for continuous monitoring of user satisfaction with the website

- **Classification of users** – ICBS should go on with the current differentiation between types of users: researchers, regular users, and a wide audience (casual users). We shall consider creating a path for regular dissemination of products to "heavy" customers - such as local authorities, research institutes, etc. and direct distribution to institutions and organizations by the API for example.
- **Users' satisfaction methodology** has been defined to be a combination of **web use of statistics** and **feedback questionnaires**.
- **Web statistics** will be based on visits in different parts of the website and in different point of time during the visit, and will follow the changes in pattern of use over time.
- **Feedback questionnaire will be posted in ICBS website** and Facebook page.
- **Telephone calls** will be made

MR24. Establishment of a plan for redesigning the website, including an improved search function

- **Creation and maintenance of thesaurus** as part of search engine
- **Introduction of a new common subject structure** must be anchored and accepted in the organization.
- **Resources (staff time) for maintaining** and developing search functions must be planned for.
- **The technical rules for updating the website** are detailed in the specification document of the new website.

Quality and metadata

General recommendations

- Three overall purposes should be declared as the ultimate goals of a metadata strategy, and they should be analyzed in a report to the top level management:
 - Cost-efficient production of statistics
 - Quality of statistical products
 - Fulfillment of user needs on documentation

- A general framework regarding quality declarations and other metadata should be developed and implemented in the subject matter units. It is important to ensure that the framework is known and accepted in the institution. Arranged seminars and workshops should ensure internal acceptance and ownership.
- While introducing a general quality framework for the whole institution, for example the European Code of Practice, avoid being over-ambitious and minimizing administrative burden on staff.
- Integrate metadata in the ICBS strategy; employ a business process model perspective; Initiate metadata project on quality, processes and parts in dissemination – e.g. quality declarations.

Recommendations for the metadata system:

Although there are examples on very ambitious implementation of metadata systems in Canada, Australia and Sweden, their ideas could be implemented with less or very few resources using standards and standard-solution, taking small manageable steps in the right direction and respecting three fundamental design principles:

- reuse of metadata (one source principle)
 - active metadata *and*
 - integration into GSBPM.
- Recommendations related to end users: Analyze known (already identified) problems on dissemination (FAQ, typical problem types, e.g. which variables/statistics would be needed by users); Establish focus groups.
 - Recommendations at process level: Instruct on benefits of common processes with specialized staff/applications performing the same tasks across units, instead of same staff performing the whole production process differently in each unit (stove-pipes). Enhance awareness of the importance of integration; Implement GSBPM (incl. translation and adaptation to ICBS). Include requirements on changing of process stemming from the on-going work on the new website; Prepare process documentation to support management, using simple templates. Communicate the purpose of documentation: knowledge management, knowledge on the use of IT etc. Document selected surveys (e.g. 5 to 10 surveys).
 - Recommendations on standards and technical implementation: Organize training, improve communication e.g. of metadata terminology (DDI, SDMX, GSBPM, GSIM etc.); Harmonization: use SDMX and DDI; Integrate work between Dissemination Unit and Subject Matter Units; Establish common concepts, e.g. Statistical Yearbook, topics and sub-topics; Continue work on common variables and code-lists with a view to moving towards SDMX and DDI; Implement standard DDI and SDMX-tools in order to be cost-effective and to ensure the use of international standards.
 - Recommendations on a Metadata and Quality Strategy document for top management: Analyze the current state at ICBS, international standards, and roles of a Statistical Metadata System. Define vision, objectives, principles and benefits (short / long term), Define tasks, roadmap and organizational structure as well as guidelines for production and use of metadata. Propose possible IT-solutions (short and long term) - high level architecture, tools, applications and databases.

4. Implementation of mandatory results

MR22. Drafting of an ICBS dissemination and communication strategy

The dissemination strategy's status in the overall ICBS strategy –

The user oriented dissemination strategy developed is based on international requirements and is part of the overall ICBS strategy, since it is the end user to whom we target all our statistical production. The strategy is structured around users (who), contents (what) and accessibility (how and when).

ICBS strategic objectives were developed in the framework of component C for 2015-2020. They derive mainly from seven principles in the European Statistical Code of Practice, which was adopted as a whole by ICBS during the project implementation:

8. Users orientation statistical production, while addressing changing needs
9. Commitment to quality
10. Micro-data confidentiality
11. Development of statistical information
12. Cooperation and coordination with producers of official statistics in the NSS
13. Ensuring on-going cooperation of data suppliers
14. Managerial, operational and economic efficiency

Towards the new website launching, ICBS strategic objectives (2015-2020) will be formally adopted by ICBS top management (June 2015?). The operational aspect of this strategy has to be clarified and introduced to the ICBS staff by that time. Organizational aspects of future web dissemination should be decided upon according to the approved strategy. The dissemination strategy should be integrated into the overall strategic planning of the NSI and it should fulfill the main goals and mission of the organization.

The role of the Code of Practice

The adoption of the EU statistical code of practice is a valuable starting point for ICBS dissemination strategy, as it describes certain minimum conditions that ICBS must fulfill in order to provide their users with compliant dissemination. Presently, the implementation of the CoP has yet to be planned.

The dissemination system of ICBS

Written dissemination principles were approved a few years ago by the management and need now to be expanded and formalised. Consequent to the new website, new procedures must be agreed upon, formulated, deployed and implemented throughout the organization.

Common topic structure across dissemination channels

Introduction of a new common subject structure must be anchored and integrated in the organization. The mapping of publications and products according to the new subject structure has been achieved by the dissemination unit as required by the website redesign tender. This was a necessary step in the content reorganization, a sheer expression of the new concept of the website architecture in which the subject matter units were pretty much involved. It will finally affect the whole organization with regards to workflow, products and publications, including the annual statistical abstract of Israel. Both staff and users will have to adjust. While searching for data users will have to relate to the topic and no more to the product or to the unit who supplied it. Defining a new subject structure is a process driven by the Dissemination unit which needs full support of top management.

Metadata strategy

The development of systematic metadata and a Metadata System were defined as crucial; designated teams were nominated and a pilot study launched using ES standard SIMS aligned with the quality dimensions of the CoP, as a basis for quality declarations and producer documentation.

See for details the dissemination policy formulated in Annex 1.

MR23. Establishment of mechanisms for continuous monitoring of user satisfaction with the website

The satisfaction indicators, methods and tools

The new structure of subject area might be extremely important to user satisfaction and usability of the website. User satisfaction with the website will be monitored on a regular basis and will be systematically followed up. We will monitor what they use, how they use it, how they succeed (general and specific products and what they want and do not get (today).

Different methods will be used to measure user satisfaction:

- Log files and web analytics – monthly reports
- Hot line (telephone and e-mail inquiries)- semi -annual reports
- Using a short version of the existing questionnaire(on user satisfaction and usability usage) at times of change ,old website –Jan2015-March 2015, and the same questionnaire on the new website – October-December 2015.
- Focus groups – every two years

The new content architecture of the website will definitely improve the service given to website users. Benchmarks, success criteria will be suggested.

Mechanisms for systematic satisfaction reporting and follow-up procedures

Increasing the involvement of users in the definition of information items to be disseminated and their accessibility modes by feedback questionnaires (on the website), yearly surveys of users, uses and focus. Documenting FAQ in a system and generating reports with different breakdowns.

See Annex 2 for details.

MR24. Establishment of a plan for redesigning the website, including an improved search function.

Presentation of the new website

The launching is planned for March 2015

The search function – See Annex 3.

5-6. Impact and sustainability

Strategic planning for the ICBS is, in effect, a necessary condition for its robust performance. Formalizing a dissemination strategy as an integral part of general strategic planning is no less critical, especially at this time. This is an era during which we see great growth in the community of consumers of statistical data, widening diversity amongst the users of statistical information, and in which possibilities for dissemination and accessibility of information via advanced technology have altered the workplace and created conditions that are different from that which existed in the past. As a result of the Twinning Project, the top management of ICBS decided to adopt the CoP and to focus on seven principles (as presented in MR13) which have consequences for customer relations, future products, and sharing, developing and consolidating information for the NSS.

The expected impact was:

- **Delineating and typifying customers:** Centralizing all customer contact taking place directly between the customer and the departments but not through the customer service/information dissemination department. Development and broadening of the Customer Relations System which was set up for the purpose of tracking the handling of tailor-made statistical products.
- **Indexing all existing products according to a new subject listing.**
- **Formalizing work protocols** (updating customer database, product dissemination, feedback, and examination of requirements) with respect to various customers/clients, such as government offices, local authorities, and researchers.
- **Metadata** formalization, according to international standards.
- Criteria for publication, self-initiated dissemination, and ongoing maintenance will be based on the dissemination policy (which will be updated bi-annually) and the launching of the new website.

The new website is expected to be launched mid-2015. Before the actual launch, the ICBS employees will be briefed about the new site and its operation. At the same time guidelines will need to be developed delineating authorizations and responsibilities for updating site content: who has rights and is responsible for updating what content, how the content will be edited for publication and who will be responsible for quality control, etc.

Upon launch, a program for optimizing familiarization with the new website will be introduced to the users to guide them in finding the data and types of content that they were accustomed to from the old website. Various new and upgraded tools and methods for searching will be presented to the user.

7. Conclusions

Besides the mandatory results and notwithstanding the synchronization challenges between the new website tender and component C activities, the Twinning project had a beneficial effect on the road map for the modernization of ICBS dissemination, as well as on discussions - within ICBS and with stakeholders:

- As a result of the Twinning Project, the top management of ICBS decided to adopt the **CoP and to focus on seven principles** (as presented in MR13) which have consequences for customer relations, future products, and sharing, developing and consolidating information for the NSS.
- Dissemination strategy – a short term and long-term plan will be formulated, and the possibility of a common statistical website with NSS partners is considered..
- The establishment of a flexible metadata system according to international standards for a wide range of users is considered.
- The development and broadening of the **Customer Relations Management System** which was set up for the purpose of handling of tailor-made statistical products is considered.
- **End-users' satisfaction will be measured**, based on the establishment of ongoing users feedback procedures.
- **Work protocols** will be formalized (for updating customer database, product dissemination, feedback, and examination of requirements) with respect to various customers/clients, such as government offices, local authorities, and researchers.
- Upon the new ICBS website launching, **a program for optimizing familiarization with the new website will be introduced to the users** to guide them in finding the data and types of content that they were accustomed to from the old website. Various new and upgraded tools and methods for searching will be presented to the use.

List of Annexes

Annex 1 – Draft Dissemination Policy (MR22)

Annex 2 – Mechanisms for continuous monitoring of user satisfaction (MR23)

Annex 3 – The search function (MR24)

Annex 1. Dissemination Strategy – Israel Central Bureau of Statistics

I Authorization, Obligation and Commitment

1 Statistical Ordinance

Israel Central Bureau of Statistics (ICBS) gathers and publishes official statistics pursuant to the Statistics Ordinance (Revised Version), 5732-1972.

ICBS is the central government entity whose function it is to collect, process, and publish statistical information about Israel's population, economy, and society. The CBS operates pursuant to the Statistics Ordinance, which defines the Bureau's goals and its modus operandi. The information collected and processed by ICBS is used by government offices, mainly for planning and making policy and for monitoring developments. ICBS is also responsible for coordinating the statistical activities of State institutions and advising them on statistics-related topics.

2 Freedom of Information Law and Dissemination Procedure

2.1 Freedom of Information Law 5758-1998

Every Israeli citizen and resident has the right to obtain information from a public authority, according to the stipulations listed (concerning security, privacy etc.). As required by law, ICBS publish an annual report, which includes information about its activities and responsibilities, and an explanation of its functions and domain of responsibility.

2.2 Dissemination Policy and Procedure

First published in 2003, the dissemination policy and procedure refers, in its introduction, to four guiding principles:

- The obligation to publish the results of ICBS activities, as encoered in the Statistical Ordinance;
- The aspiration to produce high quality statistics according to international standards;
- The commitment to confidentiality of private information;
- Availability, accessibility and efficiency of service to the public.

3 International Standards

3.1 UN Fundamental Principles of Official Statistics

Israel has supported the adoption of the Fundamental Principles of Official Statistics, as was done by the United Nations Statistical Commission in its Special Session on April 11-15th, 1994, reaffirmed in 2013 and endorsed by the Economic and Social Council in its resolution 2013/21. Furthermore, Israel is one of the 48 co-sponsors of the draft resolution of the Fundamental Principles of Official Statistics that was endorsed by the UN General Assembly on January 29th 2014.

3.2 European Statistical Code of Practice

Israel is an active ENP country and the regional statistical activity is perceived to be a steady and fruitful one since Barcelona Declaration 1994. Within this framework and as part of the Twinning Project with Statistics Denmark, launched in May 2013, ICBS has adopted the European CoP to be its operational guidelines. The implementation will be supported by the regional activity led by Eurostat.

II Vision and Strategic Goals

1 Vision and Mission

At the beginning of 2010, ICBS approved its vision, mission and guiding operating principles.

ICBS' vision is: The Right Information - at the Right Time! (referring to its double meaning as covering many of the usually used quality dimensions).

In its mission ICBS sees itself as a professional organization responsible for the official statistics of the State of Israel, and committed to providing updated, qualitative and independent statistical information, for a wide variety of users in Israel and abroad.

2 Strategic Goals

2.1 Answering local and international users' needs

Intensive globalization processes have led Israel to a decision to be part of the international community and to take part in forming policies and standards on the international level. ICBS as the leader of the NSS plays a major role in these processes and gears its efforts to adhere to the accepted standards. Moreover, ICBS gravitates toward the development of statistics required by the international agenda.

Since not all international statistics can be perceived as serving directly or indirectly the Israeli society, a potential side effect of this process is a somewhat negligence of local needs. ICBS is building mechanisms to ensure that the priorities order of statistics development is addressing first and foremost local needs.

Moreover, dissemination process will be sufficiently flexible to meet constantly changing requirements.

2.2 User friendly access to information for all

ICBS is actively seeking for improvement of all interfaces used for providing the users with statistical information. Its strategic goal is to enable easy and friendly access to the data on the web, on the phone and face to face.

The web, being the main gate for information, will be structured to allow searching information in simple queries as well as in complex queries and to serve the users "each according to his needs".

2.3 High quality Core Statistics

ICBS sets as a strategic goal the production of the main part of what has been defined as Core Statistics, and the monitoring of its quality, whether it is produced by ICBS or by other partners in the NSS.

Assessing quality is to be an integral part of the production process and quality declaration is to be an integral part of the metadata.

2.4 Full and updated metadata

Metadata are the basic elements needed for the understanding of the data published. Metadata are produced in ICBS but not in a systematic process. As a result, there is no an adopted standard and the information provided is of different types for different data. Moreover, there is no metadata system, i.e. coverage is partial, retrieval by any user is complicated and updating is not synchronized.

ICBS sets as a strategic goal the developing of a metadata system in which all statistics published will have a set of standardized metadata items, to ensure understanding and clarity of the data used.

2.5 International comparability of all statistics produced

Understanding the full meaning of the statistics provided entails the comparison with others. Evaluation of how we are doing is always described in relative terms in addition to the absolute figures. In many cases, globalization alters the reference other to be another country or groups of countries, belonging to one or another international organization.

Relative values imply the requirement of comparability, and therefore, ICBS sees the need of statistics to be defined and produces according to international standards.

ICBS is developing new statistics using international standards if there are ones. ICBS is in a process of harmonization and standardization of the statistics produces according to the new standards and classifications, and is setting the international comparability goal as a strategic goal for the short and the long run.

2.6 Single point access: Joint portal of the NSS

ICBS will promote the awareness of the NSS partners to them belonging to the same statistical system, in order to improve quality of statistics, use of resources, and service to the users.

Within this framework, ICBS is looking for a single point access to all official statistics generated in the NSS.

III Policy

1 *Equal Access for all users*

Most statistics, metadata and related products will be published on the website to allow all users to have access to them at the same time.

Information not published will be made available in an appropriate way. Special micro-data will be produced for designated users who are eligible to work with micro-data under contract.

Few government entities will get access to pre-released statistics under strict embargo, in order to allow them to prepare reaction based on the understanding of the statistics produced.

2 *Accessibility*

ICBS will make its statistical information accessible easily, in a user-friendly manner, mainly on the website, with efficient and functional naturally activated search function.

ICBS will gradually translate most of the content in Hebrew into English and Arabic.

3 *Transparency*

ICBS reputation is to be kept by being transparent in its actions, decision making, information about the statistical products and the process of their making.

On an on-going basis requests for information are answered.

Under freedom-of- information law, annual reports are generated.

4 *Relevance*

The relevance of statistics produced will be maintained vis-à-vis users' needs; their content, their quality and their timeliness.

Needs of selected users' perceived as representing the main users of official statistics in Israel and abroad, will serve to define relevance.

5 *Timely and Punctual data release*

In order to secure objectivity as well as matching with users, data release will be according to advance release calendar (ARC). ARC will be published for one year in advance, four months in advance and one week in advance. Changes in ARC will be published at least one week before the scheduled date.

6 *Consistency and Coherence*

Adhering to standards, mainly international standards, is the policy of ICBS. Cross- sectional harmonization and over-time standardization will facilitate consistency and coherence of statistics produced.

7 *Literacy*

ICBS will be active in avoiding misuse of statistics published by explaining statistics, by guiding groups of users ahead of time, and by providing feedback on misuse of statistics, if done so by governmental bodies, in a process of policy making.

8 Confidentiality

ICBS will respect the social contract with the data providers and will do its utmost to keep individual information confidential, by way of removing direct and indirect identifying information, and by isolating its working environment.

IV Implementation Principles

1 Development of statistics according to ICBS strategic goals

ICBS strategic plan includes *Official Statistics* that ICBS perceives as its responsibility to produce and provide users with.

ICBS strategy defines the different *types of users* that it has to consider when planning the development of statistics. In prioritizing *Users and Uses*, government and public institutions involved in decision making regarding public policies are first;

2 Involvement of Users

The PCS (Public Council for Statistics) represents users and will be a platform for discussion and decision making on statistics to be developed and made available for users.

In addition, users' needs will be looked for in feedback questionnaires on the web and in other modes of communication.

Designated focus groups will be established under PCS and will be consulted once a year.

3 Involvement of official statistics producers

ICBS will initiate activities for strengthening the NSS as a coordinated and professional system: MoUs will define division of labor, seminars to improve statistics quality will be conducted, and communication tools (leaflet) will be shared by the partners.

PCS as the body supporting the Government Statistician in his duties as the head of the NSS, will host NSS meetings in which statistics development program will be discussed and agreed on.

4 Development of user friendly tools for the use of statistics

In developing the new website, ICBS put emphasis on user-friendly interfaces, easy and natural search function, definitions of concepts and other substantial metadata to be linked to the statistics presented.

ICBS will aim to build an NSS portal that will serve as a single point access for all official statistics, allowing the users the use of complex multi-source information, via one interface on ICBS website.

5 Commitment to timely and effective service

ICBS is committed to a timely and effective service. ICBS will allocate trained staff to provide statistical information and related services to the users. Training will include knowledge about statistics produces, possible uses, tools to trace information, working environment, with an emphasis on the website. User-satisfaction will be monitored on an ongoing basis. The results will be published in ICBS twice a year.

6 Ongoing quality improvement

The quality of dissemination processes and the products disseminated will be improved on an ongoing basis

- by aiming to publish all statistics produces,
- by harmonizing all information provided,
- by supplementing the missing metadata,
- by accommodating the information and the working environment to the users' needs, as coming up in the different feedback initiatives,
- and by providing dissemination management with the tools needed for full monitoring and control.

7 Securing budget

ICBS will secure part of its budget for maintaining an updated and qualitative website.

ICBS will secure budget for "flag products" like the annual abstract of Israel.

ICBS will also secure budget for the organization and actual conduct of press conferences, seminars, committees and working groups, as detailed in the strategic plan.

IV Implementation Initiatives

Development of dissemination system

New website

Organization of the information

Annex 2 Mechanisms for continuous monitoring of user satisfaction with the website

End-users' satisfaction will be measured according to a number of parameters and various methods and tools, ongoing and at set intervals, governed by a regulatory procedure that is part of the dissemination policy of the ICBS.

What will be measured?

1. standard (official) products
2. the way data are presented on the ICBS webpage with regard to: accessibility, orientation (finding one's way between pages), various end-user tools (table-generators, interactive maps, charts, etc.), content, explanations and definitions (meta-data)
3. customer services: by telephone, email, tailor-made products – customer satisfaction from the tailor-made orders (format, style of presentation of data, accompanying explanations, follow-up support)
4. With the update of the main database at the next phase of the website upgrade: end-user satisfaction with the site will be checked using various techniques focusing on user-interface with the database
5. A year-end audit will be performed on all non-standard products (including tailor-made orders) – in order to ascertain whether they might be of interest to the general public (other end-users)

Tools to be used to measure the various parameters of customer satisfaction:

1. Questionnaires addressed to registered users, specifically directed towards items actually used, such as: statistics products, tools, other website components, etc.
2. A questionnaire on the website (a shortened version of the questionnaire presently on the website)
3. Analysis of customer service inquiries, categorized by type of customer and type of inquiry – this will require a designated customer service application that could record customer service interactions on a real-time basis
4. A customer request survey directed towards registered users – once per year
5. Establish a focus group that would meet biannually
6. Periodic checking of products according to quality control guidelines (relevancy, coherence, availability, publication periods, quality of accompanying metadata, etc.)

Further steps

Immediately upon official acceptance of this procedure, the ICBS will have to consider every customer request or recommendation and investigate every complaint having to do with customer satisfaction. A biannual summary (or more often) will be prepared listing the details of the customers' comments; ICBS's handling of the matter and explanation as to why a particular response was chosen.

Whereas because of the lack of an official regulatory procedure in place, users' comments in the past had no direct effect on the products and did not lead to changes, nonetheless some changes occurred due to customer requests, usually having to do with clarifications and additional explanations. However, those changes did not affect procedures or products in general.

In essence, upgrading the website and improving content were in response to user comments via the preliminary users' survey that created the groundwork for the new website.

Annex 3. The search function

A part of the new website tender, ICBS has purchased a strong search engine and created a thesaurus for common terms – terms used by the ICBS which are connected to the more commonly used terms. Press releases will be indexed too.

Therefore, a strong search engine is planned to be set in the new website. The reorganization of the content according to a new subject structure and the key wording of products, media releases and topic pages is intended to make the user navigation much easier and much more user friendly.

There will be an advanced search, according to various refiners such as date of publication, way of presentation- graphs, maps etc. and level of presentation- table generator, data warehouse etc. By the time of this summary the search engine has not yet been developed.

MR25 - Twinning activities E5 and E6.1

MR25: Establishment of rules for updating the website, including linkage of the data warehouse to the website

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List of Abbreviations

API	Application Programming Interface
CNMM	Common Nordic Metadata Model
CoP	European Statistical Code of Practice
CSV	Comma-Separated Values
DWH	Data Warehouse
ICBS	Israel Central Bureau of Statistics
IIS	Internet Information Server
ISOPED	Integrative System of Processing Education Data
IT	Information Technology (department)
MUC	Micro-data Under Contract
NSI	National Statistical Institute
PC-Axis,	
PX-Web:	A family of software for the Internet environment used to present statistics
PDF	Portable Document Format
PUF	Public Use File
SDDS	System of Data Dissemination Standards
SDMX	Standard for Data and Metadata Exchange
(MS-)SQL	(Microsoft) Structured Query Language
QAF	Quality Assessment Framework

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1. Summary description of the Twinning activities

The objective of the twinning activities was to lay the groundwork for the next step of the redesign of the ICBS website: The design of an aggregated dissemination Data Warehouse (DWH) to serve as the single source for all dissemination in ICBS, including the progressive dissemination of statistics through data cubes.

Activity E.6.1 - Integration with DataWareHouse of dissemination and website

The following items were dealt with during the meetings:

- Principles of DWH building
- Getting data to the DWH from existing data sources
- Cube design for specific statistical subject (mini-pilot)
- Integration between web site and DWH
- Linking quality metadata to the DWH
- Design and dissemination tools: Overview of the PC-Axis software family
- Work plan for developing and updating the DWH

Activity E.5 - Development of a Dissemination strategy: Follow up on Dissemination database

E5 activity was partly devoted to following up the work and the discussions undertaken during the previous activity E6.1, with focus on two main strategic issues:

- Roles and organisation of work for the DWH creation and operation
- Follow up on creation of cubes for data warehouse based on the Common Nordic Metadata Model (CNMM)

A cube containing education statistics was successfully created based on ISOPED data – with 4 dimensions and time. The exercise showed that cubes according to the CNMM standard can easily be generated from ICBS micro data.

2. Background

Currently, the structure of the site and the organization of its content do not follow accepted standards and practices. Some of the main problems in data dissemination are:

- Since different subject units update different pages in the website, statistics on the same topic may occasionally appear in totally unrelated locations and formats
- The ICBS data warehouse is not connected to the website
- Metadata is not systematically presented
- The search mechanisms are insufficient, making some data / metadata difficult to find
- Separate and unsynchronized manual updating procedures result in inconsistencies
- Data presentation is old fashioned and uninviting

However, in line with ICBS policy since 2010 which prioritize the development of standard / generic applications, the ICBS strategy drafted in the framework of the Twinning project (Component C) establishes the principle of having one common DWH to serve all dissemination channels.

This is also the strategy of Statistics Denmark, and is referred throughout this report as “the single source principle”.

3. Recommendations

The corner stone of the dissemination has to build on the *single source principle* meaning one source for all publicised statistics. This will secure consistency in data across the different products / platforms. This “single” source shall be an aggregated (but detailed) output database

The strategy should include some examples of concrete initiatives to be taken e.g. initiatives where it can be measured when the goal is reached.

Principles of DWH building

Based on single source principle, it was proposed to use the CNMM (see annex E6.1.5 for links and further information) as the relational data model for building a DWH for aggregated statistics.

This model supports the creation of “multi-dimensional data cubes” that can be used to “slice and dice” data, i.e. dynamically letting a user or a system select a subset of a large data cube, for specific data presentation e.g. as a table or graph.

By using an Application Programming Interface (API) on top of this model, it will be possible to achieve the goal of having one DWH that serves all dissemination channels.

Cubes should be built using common sets of structural metadata thereby ensuring consistency in variables and concepts. The ICBS has already begun the process of metadata harmonisation.

Getting data to the DWH from existing data sources

In order to add a new cube to the DWH (data and metadata), its structure, the classifications (that do not already exist) and the time periods must be defined. Then, secondary language, footnotes, links etc. are dealt with.

To populate the DWH with metadata, it is important to use existing sources: Informix, SQL-Server, Oracle, Excel files are relevant data sources in ICBS, as well as ICBS developed “Dictionary” and eventually, an integrated metadata system (e.g. Colectica).

Cube design

Since time series are not multi-dimensional, they could not provide the detailed information generally needed when designing multi-dimensional cubes.

Data cubes should be built based on micro-data.

Data warehouse cubes and confidentiality

Web site content should be based on aggregated cubes ONLY.

Cubes should be stored / disseminated through standard data model / standard tool –i.e. “Steal, or Buy with Pride”.

If home grown table tool is preferred, a standard cube model like CNMM should still be used. Localizing a tool like PX-Web and/ or the PX-Web API is cheaper / simpler than building a tool from scratch and will also ensure long term sustainability.

Public website should NOT include facilities for aggregating micro data.

We consider “cubes” as the only “safe” solution in terms of confidentiality but also from a performance perspective cubes are preferable.

Tools, procedures and roles

It is emphasized that in order to get quality cubes the main focus should be on the work of the subject matter units and their business process. Thus, the project with cubes is not an IT project, rather the IT department should be seen as an enabler for the project to progress and succeed.

The main elements to achieve a successful DWH are:

- Tools for inserting and updating data and metadata in the DWH
- Source data (Informix, SQL-Server, Oracle, CSV etc.)
- Source metadata (Dictionary etc. for building cubes and quality metadata for end users)
- Guidelines for designing data cubes, including user needs, confidentiality issues etc.
- Strategies and policies

The first three bullets are very much related to IT developments. The last two bullets are mainly dissemination and subject matter related, as aggregated output databases requires special skills / dedicated staff and is NOT a part of the IT organization – but has strong links to dissemination and IT.

The Code of Practice and the Quality Assurance Framework assume that timeliness, punctuality and user satisfaction are systematically **monitored** and acted upon. This must therefore be reflected in the strategy and in the daily work routines for the dissemination unit.

Integration with web site

The DWH must have an API functionality for it to be useful in different dissemination channels. In the web site, the API can be used to retrieve already updated data for tables, graphs, maps etc. The API can also be used to create an application that exposes all the data of the DWH in different ways. As inspiration, the version of StatBank Denmark for mobile phones was presented (m.statbank.dk). It was also discussed how the API can be used to create dynamic web pages and publications.

Linking to quality metadata

The DWH should retrieve its metadata from existing metadata sources (such as the dictionary system). But also descriptive metadata - or quality metadata - can be linked to the cubes in the DWH. The CNMM does not contain an internal model for quality metadata, but tables can be linked to any kind of externally placed quality reports (in PDF, web sites etc.).

It should be a strategic goal that all data in the DWH have some kind of quality reports attached, for the end users to have the relevant documentation when they use the data.

Cube presentation

The presentation software that reads the cubes from the data storage presents it in a way where the external web user can select parts or all content of the cube. It can be presented in tables, time series, graphs – and in the future also on maps (e.g. PX-web).

4. Implementation of the mandatory results, sources and methods

4.1 The single-source principle

The single-source principle has been anchored in the draft Strategic Plan of ICBS for years 2015-2020, as developed in the Twinning project for Component C (MR13), as follows:

1. Users oriented statistical production, while addressing changing needs

1.2 Single point of access to all information items and services for users and customers

- 1.2.1 Establish a single source for all dissemination to enhance efficiency, standardization and harmonization of content.*
- 1.2.2 Establish one statistical database as the only source for all disseminated data in statistical products.*
- 1.2.3 Give users access to full scale, user friendly macro database with non-confidential data (non-identified and non-identifiable).*
- 1.2.4 Enforce single sourcing for dissemination, with supporting procedures and tools.*
- 1.2.5 Manage dissemination with tools providing full control and monitoring*
- 1.2.6 Develop and maintain a documentation system for all data provided on demand to customers (complete logs).*
- 1.2.7 Provide designated training to writers of press releases in subject matter units, including dissemination procedures and writing guidelines.*

4.2 Designing of data cubes and strategic implications for the statistical production

ICBS plans to develop an aggregated dissemination DWH and to present progressively data cubes to the users, following the plan and the road map in this document. However, there has not been yet any management decision with respect to the eventual strategic decision on stopping dissemination of data series and PUF files – Public Use Files, which are anonymized individual files open to the public at large in the ICBS website.

Moreover, as part of its new website, ICBS is developing a new generic application known as "Table Generator", designed to ease the dynamic presentation of any PUF file. This application is enlarging the functionality of the Table Generators available today in the current website for specific PUF's - e.g. Table generator for the PUF on Car accidents.

A discussion of the confidentiality issues arising from larger number of PUF files accessible to the public in the site will probably lead to a top-level decision about the respective accessibility rules, functionality and risks in providing PUF files, MUC files and cubes to users. This decision will have clear strategic implications for statistical production and dissemination.

5.3 Plan for building the datawarehouse

The plan developed together with the Danish experts during the activities was adopted by ICBS and is presented in Annex 1 (MR25).

5. Impact

The main impact of the activities and the subsequent work performed in view of achieving MR25 – Establishment of rules for updating the website, including linkage of the data warehouse to the website - was to bring to the agenda of ICBS a discussion about

- The application of the single source principle, i.e. a single DWH for all dissemination
- Considering adopting data cubes as the primary tool for all statistics dissemination to the public.

The first subject has already entered the draft strategy of ICBS – 2015-2020 which is expected to be officially approved in 2015 by ICBS management. The discussion of the second subject in ICBS is in itself very beneficial, and the alignment of ICBS to the world trend towards data cubes will have clear impact on production processes and costs.

6. Sustainability

As outlined above, the main implications of the activities planned for the MR achievement reach far beyond the objectives defined for the MR, and the adoption of the single-source principle could only have long-range effects as implemented in IT and website systems.

7. Conclusions

The achievement of MR25 has brought important strategic discussions with Far-reaching implications in IT systems, especially in connection with the new ICBS website.

Annex

Annex Final report MR25 Plan and road map for building the data warehouse.

Annex. Plan and road map for building the data warehouse

Initiate strategic measures

A strategic measure could be (the following dates are for illustration only):

“In 2020 all officially published data are derived from the Data Warehouse, having all data in aggregated output database (cubes). This includes SDDS; SDMX and international data transfers being done automatically.”

It should be decided when and with which data the DWH can be launched to the public, i.e. minimum requirements for the content and functionality of the DWH at the time launching.

Develop or install tools

It is necessary to develop or install tools to:

- Insert Code lists etc. (e.g. from the Dictionary system)
- Define cubes
- Load data (from existing data sources)
- View data (internally, before release and externally)

Initiate a pilot project

A pilot project should be initiated as soon as possible and run for about 6 months, involving subject matter units, dissemination and IT. The goals could be

- The creation in DWH of a number of specific statistics from selected subject areas
- The identification of needed guidelines, policies and procedures

See the road map proposed for the cube project below.

A comprehensive test of CNMM and PX-Web should be done. Staff with an understanding of database technology and metadata to test the CNMM should be assigned to this test/ pilot project.

The necessary technical requirements shall be put in place. This covers: Internet Information Server (IIS), MS-SQL Server, and PX-Web installed on a standalone computer (due to security issues raised by ICBS)

Evaluate the pilot test, results and benefits: Support the recommended “Pilot” – get understanding of cube benefits and the required organizational set up.

Create guidelines and policies

Using the results of the pilot, develop guidelines, policies and procedures concerning the design of data cubes, naming conventions, rules for confidentiality etc. Furthermore, establish policies related to the release of data and updating procedures. Define the sharing of responsibility for the different parts of the process among the different parties involved (IT, Dissemination and subject matter units).

Plan project's full implementation

Investigate license costs and In-house development costs;
Depending on management decision, plan: Road map, including staffing and developing of tools etc.

Full-scale implementation (roll-out)

Road map for the cube project

- Management decision and definition of purpose
 - Set a goal: Launch with 25-35 cubes
 - Evaluate the processes, including input to design guidelines
 - Estimate the costs
- Road map including time table (mile stones)
 - Month 1: Pilot project leader/coordinator and implementation team
 - Dissemination (2), IT (1), metadata (1), methodology (1), subject matter units (3)
 - Month 1: Choosing the topics
 - Depending on different (micro) data characteristics (all subjects covered or, recommended, a few in depth)
 - Month 2-4: Choosing cubes – designing and building the cubes including structural metadata
 - Most popular cubes from the chosen topics?
 - Most frequently updated cubes? – including example of monthly updating
 - Confidentiality committee's approval
 - Updating procedure to be tested (already existing data being updated)
- Month 5: User meetings
 - Meetings with externals to present and get feedback regarding relevance, user-friendliness and accessibility, clarity – discussion of the product
 - Invite key users of the produced cubes
- Month 5-6: Evaluate
 - Management information session and decision
 - Internal information meeting (depending on management decision)
 - Planning the full-scale implementation (roll-out) (depending on management decision): Road map, including staffing and developing of tools etc.