

Terms of Reference

EU Twinning Project IL/12 CRIS 2015/370-467

10-13 September 2017

Component D: Methodological and geo-spatial tools for improving the quality and efficiency of field surveys

Activity D.6: Design specifications of a geo-spatial application to allocate interviewers' workload in multi-field surveys and to manage and monitor field surveys

0. Mandatory results and benchmarks for the component

Mandatory results:

- *Optimization of field workload allocation using geo-spatial tools for managing field surveys in designated area*

Benchmarks:

- **ID1:** Definition of indicators to measure the efficiency of field work and reliability of estimates with a view to reduce costs and improve sample quality developed by 3rd quarter (Completed);
- **ID2:** Methodological paper on managing and monitoring field work using geo-spatial procedures during data collection process by 3rd quarter (completed);
- **ID3:** Methodological paper on optimisation of workload allocation of fieldwork using geo-spatial procedures and other tools by 3rd quarter (completed);
- **ID4:** Feasibility test for optimizing workload allocation of field work evaluated, including determination of optimal size of enumeration areas by 6th quarter (August 2017);
- **ID5:** Design specification for an integrated management system for multi-field work load allocation and monitoring survey status in real time in designated areas by 8th quarter (January 2018) ;
- **ID6:** A roadmap for an integrated management system for multi-field work load allocation and monitoring including milestones, deliveries, time frame, need for resources and responsibility presented to the ICBS management by the 9th quarter (May 2018);
- **ID7:** Multi-year work plan for the organisational framework and training plan for managing field surveys in designated areas 10th project quarter (August 2018);

1. Purpose of the activity

The main purpose for this activity will be drafting specification for a future model for an integrated management system for multi-field work load allocation and monitoring including:

- Story board for functions, role and technological requirements a for a future *Multi Suvey System (MSS)* on:
 - Field supervisor
 - Headquarters supervisor
 - Field manager
 - Headquarters manager
- Outline for step by step implementation with milestones and deliverables (Roadmap)

The focus of the storyboard should be on tools assisting sampling and allocation and management of multiple surveys taking travel distance into consideration for the four main social surveys - Labour Force Survey, Household Expenditure Survey, Social Survey and Longitudinal Survey.

The storyboard should be precise enough to be used for (i) Design specification for a supporting IT system (ii) Detailed work plan with mile stones, (iii) Evaluation of resources needed for project (human resources, costs etc).

Headline for each of the three days will be:

- Day 1 – Introduction and presentation of the draft storyboard by ICBS
- Day 2 – Discussion and working on design specification of the Storyboard (Product degradation)
- Day 3 – Detailed work plan including milestones, time frame and resources needed to achieve the vision

2. Expected output of the activity

- Activity report
- Storyboard produced
- Detailed roadmap with mile stones outlined
- Analysis of resources needed for project (human resources, costs etc).
- Recommendations on how proceed in order to improve the planning, management and monitoring of face-to-face surveys with particular focus on the four main social surveys (Labour Force Survey, Household Expenditure Survey, Social Survey and Longitudinal Survey).

3. Participants

From Israel

- **Mr. Nitzan Hachohen**, Senior Director of Survey Department, ICBS. Prior to his current position Nitzan Hachohen was head of domain of the population field work census that was implemented in 2008. In 2009 Nitzan Hachohen joined the Survey Department. The Department is responsible for planning and managing all the ICBS surveys and censuses. Email: Nitzanh@cbs.gov.il
- **Ms Limor Charnotzki**, Director of Households surveys, survey Department ICBS. Ms Limor Charnotzki is working at the Survey Department since 2002. The Department is responsible for planning and managing all the ICBS surveys and censuses. Ms Limor Charnotzki manages the planning and managing of two surveys the longitudinal survey and the Social survey. Email: limort@cbs.gov.il
- **Mrs. Anna Binstok Cohen**, Director of GIS for Census Division, ICBS. Anna Binstok Cohen is in charge of GIS operations for census purposes since 2005. Anna Binstok Cohen works in the GIS Sector that is responsible for providing the geographical infrastructure, geocoding and GIS services for all projects in the ICBS. Anna Binstok Cohen took part and had acquired experience in a variety of GIS projects in the ICBS. Email: annabc@cbs.gov.il
- **Mr. Tzahi Makovsky**, Deputy Senior Director, Statistical Methodology Department, ICBS. Tzahi joined Statistical Methodology Department in 1988 and was part of a team responsible for sampling in household surveys. In his current position Mr. Tzahi Makovsky is responsible for several sectors dealing with sampling and estimation methods for household persons & business surveys in ICBS. Email: Tzahim@cbs.gov.il
- **Ms. Galina Seinberg**, Director of IT Sector for Census, IT Department, ICBS. Galina joined the IT Department in 2000 and was part of a team responsible for computerizing the 2008 Population Census. Since 2012, Ms. Galina Seinberg has been the manager of the IT sector in charge of the Census, Longitude Survey and other surveys. This position includes computerizing for WEB, mobile, tablet/laptop and management systems. Email: galinash@cbs.gov.il

- **Mrs. Luba Faktarovich**, Coordinator of Households Surveys, Survey Department ICBS. Ms. Luba Faktarovich is responsible for the longitudinal survey and the social survey since 2011. The Survey Department is responsible for planning and managing all the ICBS surveys and censuses. Email: luban@cbs.gov.il
- **Mrs. Charlotte Nielsen**, Resident Twinning Adviser since March 2016 where her main responsibilities include planning and co-ordination of Twinning activities with the ICBS, the European Union Delegation, stakeholders and experts from EU member states. From 2008 - 2016 Ms. Charlotte Nielsen, hold a position as Senior Advisor in the Research Services division of Statistics Denmark. Charlotte Nielsen has a Ph.D. in insect pathology and a master degree in agricultural studies. Email: cln@dst.dk
- **Ms. Tamar Rand**, Resident Twinning Adviser Assistant since March 2016 where she assist in the co-ordination and liaison with the ICBS, the European Union Delegation, stakeholders and experts from EU member states; Furthermore, Tamar Rand perform interpretation and translation from Hebrew to English and vice versa. Before entering the Twinning project Tamar Rand worked as a Manager of Recruiting and Training in a large educational tourism business. Tamar Rand has a MA in Early Childhood Development. Email: tamarra@cbs.gov.il

MS experts

- **Mr. Michael Specht**, Chief Adviser, The Management Office, Statistics Denmark. *Education:* Master in Project management and Master in Computer Science and automation. *Main activities and responsibilities at Statistics Denmark:* Project Manager in different strategic projects for Statistics Denmark.
- **Mr. Jesper Blaabjerg Holm**, Head of Section, The Management Office, Statistics Denmark. *Education:* Master of Social Science - European Studies. *Main activities and responsibilities at Statistics Denmark:* Project Manager in different strategic projects for Statistics Denmark.

4. The current situation for social surveys at ICBS

The current situation for workload allocation, monitoring and management of field work at ICBS is that each survey is allocated to interviewer, managed, monitored and performed separately at all organizational levels - Headquarter, regional managers, interviewers.

The Central Survey Headquarter is located at ICBS in Jerusalem and the three Data Collection Centres are located in Haifa, Tel Aviv and Jerusalem. Each Data Collections centre is managed by a District Manager and in Tel Aviv they are assisted by two Regional Manager as well due to its large size.

The Jerusalem District is organized slightly different since the Data Collection Centre is a part of the CATI Centre and thus has three managers.

Each Data Collection Centre manages a number of Domains i.e. a survey area for which a supervisor is responsible. At present the total number of domains is 35. Each domain has one full time Supervisor for managing the Domain and the interviewers associated with their specific Domain. Each domain/supervisor is responsible for only one survey (except in Jerusalem where each domain is responsible for multiple surveys). The supervisor in each domain is responsible for 8-12 field interviewers

The four core social surveys carried out on a regular basis at ICBS are:

- Labour Force Survey (LFS) – Monthly panel survey with 18.000 respondent
- Household Expenditure Survey (HH) – Yearly Survey with 14.000 respondent
- Social Survey (SS) – Yearly survey with 10.000 respondent
- Longitudinal Survey (LS) – 18.000 respondent

The Central Population Register (CPR) is used as the basis for sampling individuals and households for Social Survey and for the Longitudinal Survey. The Dwelling Register is used as the basis for sampling dwelling units for the Labour Force Survey and the Household Expenditure Survey. By using the address geo-coding application the exact x,y coordinates can be found for 74.5% of the addresses in the Central Population Register and for 79% of the addresses in the Dwelling register. However, for each register respectively 98.6% and 92.5 % of the records can be placed in a defined Statistical area (A residential statistical area usually contain 3,000 – 4,000 persons).

For detailed information about the current situation please consult Annex A of this ToR.

5. Vision

The overall vision is to the quality and efficiency of field social surveys at ICBS and thereby reduced cost for the four main social surveys carried out on a regular basis at ICBS. They are:

- Labour Force Survey (LFS) – Monthly panel survey with 18.000 respondent
- Household Expenditure Survey (HH) – Yearly Survey with 14.000 respondent
- Social Survey (SS) – Yearly survey with 10.000 respondent
- Longitudinal Survey (LS) – 18.000 respondent

In previous missions of the Twinning project the following the following focus areas has been identified in order to acheive this vission.

- Built a stadardized database to be used as the ground for all surveys
- A coordinated workload allocation, management and monitoring platform
 - The platform should be built on the basis of of emuration areas (EA's) in order to provide ng the same infrastructure for field allocation, managing and monitoring
- Optimization of the workload allocation process for interviewers for multiple surveys based on geo-position/travel distances but also taking into consideration (i) the constrains in each survey - like for example time frame that each survey has to be performed in, time needed for each survey, etc. and (ii) unique population characteristics
- To integrate and optimize progress reports by GIS viazulization and autmated warnings for problems encountered by the system (e.g. area's with slow progress.....)
- Combining collection methods: CAII, CATII, CAPI (Multi-mode collection method)
- The organizational strucure in multi-field survey framework
- Training plan for regional managers as well as interviewers when moving from a single survey approach to a multi-field survey approach

6. Status and progress achieved so far

The main achievement of this component until now is general agreement and acceptance within the ICBS of the benefit of establishing hierarchical geographical areas that are stable over time and space and can be used for any survey. Changes in areas over time should only be done in those cases where the urbanization processes require changes due to exceeding the size thresholds set for each geographical areas. Based on the Polish setup and their experiences they recommended a two level hierarchical system consisting of Enumeration Area (EA's) as the smallest area followed by Statistical Units (SU's) as the next level. MS experts from Poland has recommended that each EA should, in order to keep the flexibility high, not consist of more than 200 dwellings and 500 individuals and that each statistical unit does not consist of more than 999 dwellings and 2,700 individuals, respectively. Furthermore, it was emphasised by the Polish experts that one SU can consist of no more than 9 EA's in order to keep an easy manageable hierarchic structure.

At ICBS already established census cell containing a maximum of 50 households and Statistical areas of approximately 3000 households has been used as the ground for testing the optimal size of EA's in multi-field workload allocation. The multi-field workload approach for allocation of interviewers was tested by using 2015 data from the four largest social surveys in Israel including both longitudinal and yearly surveys of persons and households (Figure 1). The initial test showed that theoretically the cost of field work can be

reduced at least 70% by having interviewers conducting multiple surveys instead of just one - simply by reducing travel time by each the interviewer. Currently the situation is that three different interviewers can each be assign to perform different surveys e.g. LFS, SS and HH on the same street on the same day (Example from real life mapped in Figure 1 – in the new approach both surveys will be performed by just one interviewer. Further tests will be needed in order to determine the optimal EA size and characteristics. The new EA's will also serve as the basis for the development of a tool that can visualize the progress of surveys in real time for management and monitoring purposes by click from table to graph to map (synchronized).



Figure 1: Illustration of the current situation where three different interviewers go to the same locality on the same night for three different surveys, each of them traveling 34, 39 and 43 km respectively. In the new approach all three surveys will be visited by the same interviewer e.g. the one living 34 km away. However, besides distance, population characteristics and qualification of interviewers such as language skills will be taken into account in the allocation of the right interviewers.

Programme for Activity D6: 10-13 September 2017

Design specifications of a geo-spatial application to allocate interviewers' workload in multi-field surveys and to manage and monitor field surveys

Date	Place	Time	Event
Sunday – 10 Sept. <i>Presentation of current situation and vision</i>	Meeting room 3 rd floor	09:00	Welcoming, acquaintance, programme of the week (Charlotte Nielsen and Nitzan Hacoen)
		09:15	BC: Introduction to component D and Introduction to Survey Department
		09:45	BC: Current situation and progress
		10:45	Coffee break
		11:00	BC: Introduction to the MSS
		12:00	Lunch break
		13:15	MS: Introduction to project management of IT development projects at Statistics Denmark – The project Product management triangle (Costs, time, quality), Organization, process, follow up etc. (Michael Specht and Jesper Blaabjerg Holm)
		14:15	Coffee break
		14:30	Discussion, questions and remarks
		15:30	End of the day
Monday - 11 Sept. <i>Discussion and design specification for story board</i>	Meeting room 3 rd floor	09:00	MS: First day review
		09:30	Discussion – part 1. Story board for Interviewer
		10:30	Coffee break
		10:45	Discussion – part 2. Story board for field supervisor
		12:00	Lunch break
		13:15	Discussion – part 3. Story board for field district manager
		14:30	Coffee break
		14:45	Discussion – part 4. Story board for headquarters ICBS coordinator
		16:00	End of the day

Date	Place	Time	Event
Tuesday - 12 Sept. <i>Roadmap</i>	Meeting room 3 rd floor	09:00	MS: Second day review
		09:30	Based on the revised storyboard drawing a Roadmap including <ul style="list-style-type: none"> • Milestones • Deliveries • Time frame • Need for resources • Responsibilities <p>The road map should be SMART - <u>S</u>pecific, <u>M</u>easurable, <u>A</u>chievable, <u>R</u>elevant, <u>T</u>ime-Bound</p> <p>Moderated by MS</p>
		10:30	Coffee break
		10:45	Drawing a Roadmap - continued
		12:00	Lunch break
		13:00	Drawing a Roadmap - continued
		14:45	Coffee break
		15:00	Presentation of outline for roadmap for the management
		15:30	Final remarks and thanks
Wednesday - 13 Sept. <i>Writing up report</i>	Charlotte's office	09:00	MS: Writing up reports and ad hoc meetings with BC if needed

Abbreviations:

BC = Beneficiary Country (Israel)

MS = Member State (Denmark)

ICBS = Israeli Central Bureau of Statistics

IT = Information Technologies

GIS = Geographic information system

MSS = Multi Survey System

Material to be prepared and sent before the Activity:

Presentations.

ANNEX A:

Current situation at ICBS

2.1.1 Organization and responsibility

The main function of the Survey department at ICBS is to plan, monitor and perform surveys. Surveys include field surveys, telephone interviews as well as web based-surveys.

In figure 1 the organizational structure of survey Department at ICBS is outlined. For field surveys the most important Units are **The Central Survey Headquarter, three Data Collection Centers, two Regional Centers and 35 Domains** (Please see organizational structure in Figure 1).

The Central Survey Headquarter is located at ICBS in Jerusalem and the three Data Collection Centers are located in Haifa, Tel Aviv and Jerusalem. Each Data Collections center is managed by a District Manager and in Tel Aviv they are assisted by two Regional Manager as well due to its large size.

The Jerusalem District is organized slightly different since the Data Collection Center is a part of the CATI Center and thus has three managers.

Each Data Collection Center manages a number of **Domains** i.e. an enumeration area for which a supervisor is responsible. At present the total number of domains is 35. Each domain has one full time Supervisor for managing the Domain and the interviewers associated with their specific Domain. Each domain/supervisor is responsible for only one survey (except in Jerusalem where each domain is responsible for multiple surveys). The supervisor in each domain is responsible for 8-12 field interviewers (adding up to nearly 300 field interviewers in total). The domain supervisors as well as the regional managers operate from the Data Collection Centers. The geographical area covered by each supervisor/domain differs between each survey.

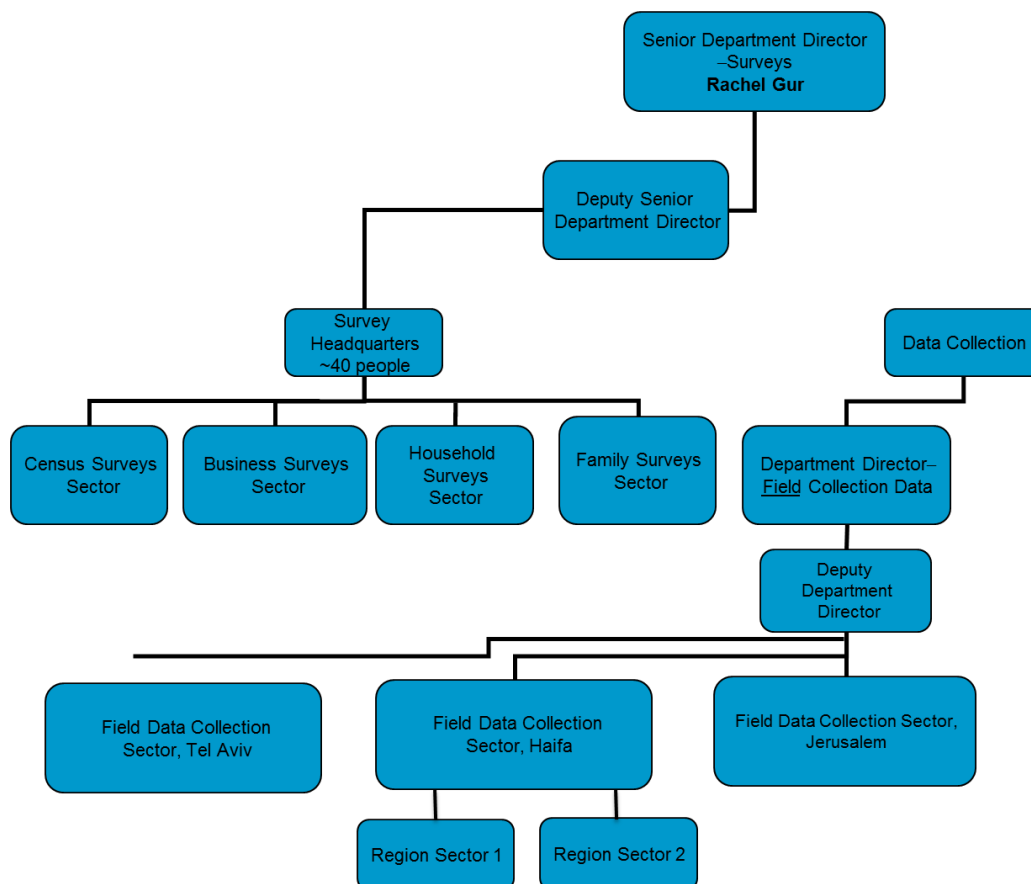


Figure 1: Diagram of the organizational structure for field surveys at the Survey Department at ICBS

Main tasks of Survey Headquarters

The main tasks of the Survey Headquarters are:

- **Thorough study of the survey topics:** written material, meetings with experts in the field (e.g. the subjects Units, the Methodology Department and the IT department)
- **Building tools for conducting the survey:** questionnaire, work procedures, computerized collection systems, training material
- **“Testing of tools”:** Piloting the tools, pretest
- **Training:** creating a training system, classroom training of coordinators and interviewers, planning and conducting individual training
- **Planning the budget required for the survey**
- **Checks and supervision**
 - Quality checking of the interviewers
 - Progress of the enumeration
 - Accompanying field interviewers
 - Keeping to schedule and budget
- **Drawing conclusions and learning lessons:** Writing summary reports for every survey
- **Allocation of workload**

Main tasks for the Data Collection Centers (Center Manager, Region Manger and Supervisors)

The main tasks for the Data Collection Centers are:

- Recruitment of interviewers
- Data collection from the interviewers
- Managing the interviewers and managing the collection of the data:
 - Assigning workloads
 - Arranging interviewers' mobility in geographic areas/between surveys
 - Administrative management of the interviewers
- Handling refusals to respond
- Dealing with response burden
- Training and teaching in guidelines
- Checks and monitoring
 - Checking the enumeration
 - Accompanying interviewers
- Administrative checks
 - Efficiency of enumeration route
 - Time invested in an enumeration unit
 - Work hours reporting

Main tasks for the interviewer

The main tasks for the Interviewers are:

- Training
- Preparation
- Driving to the respondent
- Performing the field Interview

2.1.2 Field surveys performed by ICBS

The Survey Department runs about 50 surveys, distributed among

- (i) Family/individual surveys
- (ii) Household surveys
- (iii) Business surveys
- (iv) Census surveys

At the ICBS four major field surveys are carried out on a regular basis. These are:

- Labour Force Survey (LFS) – *Monthly panel survey with 18.000 respondent*
- Household Expenditure Survey (HH) – *Yearly Survey with 14.000 respondent*
- Social Survey (SS) – *Yearly survey with 10.000 respondent*
- Longitudinal Survey – *18.000 respondent*

For these four surveys ICBS enjoys a field response rate of approximately 80%.

The samples of these surveys are drawn and allocated separately for each survey expect in Jerusalem.

2.1.3 Methods

Field surveys are performed by face-to-face interviews either by means of using a laptop computer – CAPI or by data collection using paper questionnaires in the case of the Household Expenditure Survey.

2.1.4 Drawing of sample units

The Central Population Register (CPR) is used as the basis for sampling individuals and households for Social Survey and for the Longitudinal Survey. The Dwelling Register is used as the basis for sampling dwelling units for the Labor Force Survey and the Household Expenditure Survey. The Central Population Register is updated three times a year and consists of about 9 million records/individuals distributed among nearly 500.000 addresses. The main supplier to the Central Population Register is the Population & Immigration Authority. The Dwelling Register is updated once a year (May-June) and consists of about 3.7 million records (addresses). The sources of the Dwelling Register are 10 different suppliers that provide service for property tax purpose.

2.1.5 Geo-coding

For both registers addresses are not always as accurate as needed e.g. the addresses might only be a partial address, it could be an old address or the record can lack address information entirely. Nevertheless, ICBS has built an address geocoding application that uses algorithm and address dictionaries in order to translate addresses both back and forth in time as well as assigning incomplete addresses to a defined Statistical area.

Statistical areas: Urban localities with more than 10,000 residents are divided into statistical areas. These are small geographic units as homogeneous as possible, which it is possible to reflect the unique characteristics of certain areas within a locality. A residential statistical area generally numbers 3,000 – 4,000 persons

By using the address geocoding application exact x,y coordinates can be found for 74.5% of the addresses in the Central Population Register and for 79% of the addresses in the Dwelling register. However, for each register respectively 98.6% and 92.5 % of the records can be associated with a defined Statistical area.

Geocoding to a statistical area is regarded as sufficient for most field allocation needs.

2.1.6 Allocation of workload

The workload allocation is performed centrally at ICBS. Before workload allocation to specific Interviewers is initiated, the four steps shown in Figure 2 are performed:

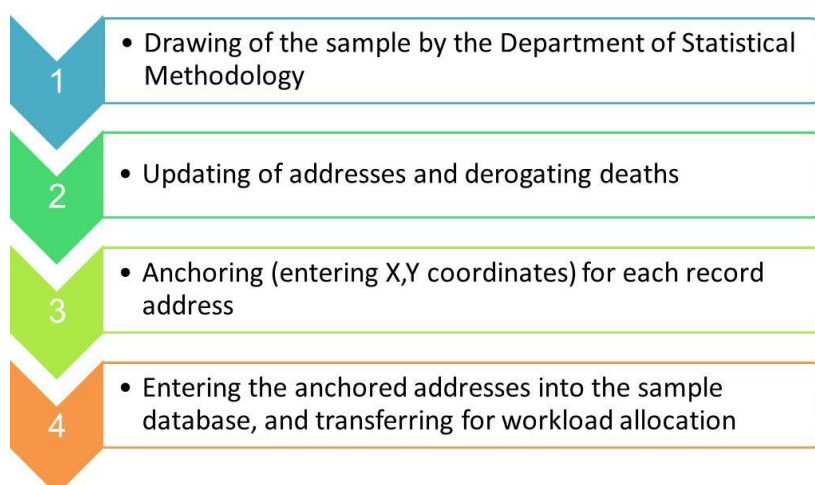


Figure 2: Project stages before workload allocation

For each of the four major recurring surveys the ICBS has developed separate workload allocation systems.

The system allows creations of monthly workloads containing addresses for each individuals or households in the workload. After that workloads are manually assigned to the interviewers. The workload allocation system provides a geographic display of the distribution of individuals or households in the sample (respondents). The display uses three layers of information:

- (i) Roads and Streets
- (ii) Locality borders
- (iii) Buildings and addresses

The interviewers' home address, qualifications such as e.g. language skill are not taken into account at this stage of allocating workloads.

2.1.7 Monitoring field work and interviewers

Supervisors monitor and guide the interviews.

2.1.8 Remunerating system for interviewers

Each interviewer is hired by ICBS to work approximately 80 hours per month. The interviewers usually work on a single survey only. The interviewer is paid by the hour for training, transportation and interviewing. In addition, the interviewer will be paid separately per kilometer driven or public transportation expenses.

2.1.9 Cost associated with surveys

Cost for conducting field surveys can basically be divided into salaries and cost associated with travel of the Interviewers, IT related costs, rent of Office space and other running costs. Below some of the major expenses are listed.

Salaries:

- Salaries for staff members in the central surveys headquarters ~ 40 full time persons per year (including staff members for telephone interviews and web questionnaires)
- Salaries for staff members of Subject Units (according to time used) ~ xx full time persons per year
- Salaries for staff members from the Methodology Department (according to time used)
- Salaries for staff members from the IT Department (according to time used)
- Salaries for staff members from the HR Department (according to time used)
- Salaries for managers of Data Collection Centers including regional managers and managers in Jerusalem ~ 6 full time persons per year
- Salaries for domain supervisors ~ 35 full time persons per year
- Salaries for interviewers ~ 150 full time persons per year (salary is based on an hourly fee, therefore the calculation is an estimation)

Cost associated with travel of the interviewers:

- Travel distance and time

IT related costs:

- Computers
- Programs

Other Costs:

- Rental of office space