EU Twinning Project

Forwarding Armenian Statistics through Twinning

AM09/ENP-PCA/TP/04

MISSION REPORT

on

ICT SOCIETY STATISTICS

Activity F.6: Review of implementation

Mission carried out by

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Armenia 19–23 November 2012

Final version

National Statistical Service
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External annexes (not published on the internet)
ICT Usage in Armenian Enterprises and Institutions (pilot study report)

List of Abbreviations

BC	Beneficiary Country
MS	Member State
MSE	Member State Experts
NSSRA	National Statistical Services of the Republic of Armenia
RTA	Resident Twinning Advisor
ToR	Terms of Reference

1. Executive Summary

The report discusses the overall methodology of the future survey on ICT usage in Armenian enterprises. This way, the work during the Twinning project is summed up, and the last recommendations from the MS Experts are provided to the BC Experts at NSSRA. It is recommended to only gradually develop the questionnaire, and to use the first survey years to establish a base and a time series of the core indicators. The sampling frame should follow the EU regulation, but taking the Armenian business demography into account it could, at a later stage, be relevant to sample also enterprises with less than 10 employees. Weighting of the results is discussed as this was not relevant for the implemented pilot studies, but should be applied for the full scale surveys. A planning tool was developed for the very first sample as well as generally for the following years' surveys.

2. General comments and background

The mission report was prepared by the MS Expert as an outcome of the short term expert mission to NSSRA, activity F.6 within the ICT Society Statistics component of the EU Twinning Project "Forwarding Armenian Statistics Through Twinning".

Before the F.6 activity, the pilot study report "ICT Usage in Armenian Enterprises and Institutions" had been finalized and distributed to stakeholders. The pilot study documents that NSSRA is ready to implement full-scale surveys on ICT usage in enterprises and in the public sector.

The pilot study together with a forthcoming press release on the ICT usage in Armenian ministries documents that the mandatory result of the component is fulfilled: *"Enterprise and institution ICT survey rolled out and published".*

In particular, the mandatory result has been fulfilled when taking into account discussions at meetings in the Steering Committee and correspondence between the project management and the EU Delegation on the precise interpretation of the specified mandatory result.

The work under component F has proved that NSSRA is capable of carrying out the ICT survey. Production systems for data capture, error checks and tabulation has been developed for the pilot survey and is supposed to be updated and reused for the first full-scale survey.

Use of the NSSRA business register for sampling, weighting and control will be important for the quality and representativeness of the results. The relevant knowledge to carry out these activities is in place.

The MS Experts would like to thank the staff at NSSRA, especially Mr Ananyan and Ms Harutyunyan, for always providing valuable information, and for the open and friendly co-operation during the project's implementation.

The planned activities and the expected output of the F.6 activity were achieved - cf. the ToR (Annex 1) and the programme (Annex 2).

3. Review of the implementation of the component

F1-F2: Identification of issues

The first mission (May 2011) provided an overview of the ICT statistics already produced in Armenia. NSSRA is already producing ICT statistics on the supply side (the ICT sector) and on the demand side (ICT usage in households). Also the Enterprise Incubator Foundation (EIF) produces statistics on the supply side and ICT usage in households.

The EU regulation and the recommendations were presented together with MSE experiences on measuring ICT usage in enterprises as well as in the public sector units (the latter not covered by the EU framework).

No significant obstacles for the survey were observed, except lack of resources allocated to do a survey. A roadmap for the survey was drafted. User needs were drafted based on existing international indicators and after consultation of main stake holders outside NSSRA.

F5: Study visit
A study visit in Denmark (August 2011) presented the system of Danish ICT statistics and its relation to the EU regulation. NSSRA presented a draft questionnaire for the ICT usage survey in enterprises.

F3: Sampling method
The mission on sampling method (Nov. 2011) followed up on the previous activities and analyzed the sampling design further.

It was concluded that the draft questionnaire met the EU standards. It had been presented to external stakeholders and a workshop was held during the mission. Stakeholders provided valuable inputs and an additional hearing of the questionnaire was decided.

Due to lack of resources NSSRA had decided to carry out a pilot survey with a limited sample of enterprises, focusing on gathering methodological experience. This was also discussed at the meetings in the Steering Committee. The survey would include central public sector institutions (the 17 ministries), based on an adjusted version of the enterprise questionnaire.

The sampling design for a full-scale survey was discussed according to EU standards as well as Armenian needs. NSSRA produced tables on the enterprise population comparable to the EU model surveys.

Regional dissemination is normal in Armenian statistics. However, as about 70 per cent of these enterprises are located in Yerevan, sample based coverage of each region is difficult. The regional level is not a part of the EU requirements (unless a regional breakdown is requested for a member state in particular).

Other methodological recommendations included weighting and other kinds of data processing (error correction, tabulation programme).

Strata for the sampling of the pilot survey were suggested based on a cross tabulation of 4 size classes (no. of employees) and 4 activity (Nace classes).

F4.1: Analysis and data processing
Before this mission (May 2012) NSSRA had carried out the pilot surveys for enterprises and institutions (see paragraph on the pilot study).

Comprehensive data material (anonymized datasets, output tables) were provided for MSE in advance.

During the mission the results were analyzed. The structure for a Pilot Study Report was made together with a roadmap for the ICT statistics component. It was also decided that the final result of component F will be a strategy for future ICT usage surveys.

F4.2: Optimization of sampling
The tables from the business register were further analyzed and a strategy for the sampling of the full scale survey was developed, presenting alternative solutions for the future strategy.

General principles for the sampling were agreed: Use of register-based data, random stratified sample, strata by size classes and activity (NACE rev. 2), optimizing the selection by using,

The alternative solutions dealt with the possibilities whether to include or exclude the regional level in the stratification of the sample.

The pilot study

The agreed questionnaire was tested by 100 enterprises. The data collection took place in February and March 2012.

The pilot study of enterprises had the following characteristics:
- Mandatory, via self-administered questionnaires
- 100 enterprises in Yerevan Region only
- Selected in 16 strata (four industry groups, four size classes)

Due to the small number of enterprises weighting has not been applied. In general these results should not be considered as representative for the target population and should not be disseminated as statistics.

Some issues on the indicators were identified from the contact with the respondents. These issues are also known in established surveys in EU member states. They are thus not special for the pilot study conducted by NSSRA, but rather standard conditions to be aware of doing an ICT survey.

As a supplement to the enterprise pilot a survey was done in the 17 Ministries, based on an adjusted version of the enterprise questionnaire. Responses were achieved from 16 of the ministries. The high coverage makes it possible to use the results for dissemination and NSSRA has thus decided to publish these results on its website.

For final questionnaires and further methodological information, please see the Pilot Study Report (NSSRA, 13 November 2012).

4. Final recommendations and plans for the future surveys

The recommendations in the following are agreed by MSE and NSSRA as guidelines for the future survey on condition of adequate financing. Please also see previous mission reports as well as the pilot study report for further documentation of the methodology.

The work under component F has proved that NSSRA is capable of carrying out the ICT survey. The EU methodology has been analysed and adjusted for Armenian implementation in a full-scale survey and has been tested in the pilot survey.

Production systems for data capture, error checks and tabulation has been developed for the pilot survey and is supposed to be updated and reused for the first full-scale survey.

Use of the NSSRA business register for sampling, weighting and control will be important for the quality and representativeness of the results. The Methodology Division is aware of the methods needed, and has the relevant knowledge to carry out these activities.

4.1 Main principles of the survey methodology

In order to have harmonised statistics, allowing benchmarking with EU countries, NSSRA will use the same methodological approach as EU regarding target population, sampling, grossing up procedures and definitions of the variables.

The target population is the starting point in following the EU standards. The stratification by activity and size groups should make it possible to deliver results with a standard EU breakdown. However,

the dissemination at a national level is not bound to the EU standards and should rather take national peculiarities into account.

Also it should be noted, that some of the recommendations are not specific for the ICT surveys. For instance weighting and stratification of the sample should be applied, but the exact method for doing this would not be different from recommended methodology for other sample based surveys.

4.2 Coverage/ target population

The target population for the survey would be:

- Enterprises with 10 employees or more
- Including the following industries:

  Enterprises classified in the following categories of NACE Rev. 2:
  - - Section C – *"Manufacturing"*;
  - - Section D,E – *"Electricity, gas and steam, water supply, sewerage and waste management"*;
  - - Section F – *"Construction"*;
  - - Section G – *"Wholesale and retail trade; repair of motor vehicles and motorcycles"*;
  - - Section H – *"Transportation and storage"*;
  - - Section I – *"Accommodation and food service activities"*;
  - - Section J – *"Information and communication"*;
  - - Section L – *"Real estate activities"*;
  - - Division 69 -74 –*"Professional, scientific and technical activities"*;
  - - Section N - *"Administrative and support activities";*
  - - Group 95.1 - "*Repair of computers*";

This corresponds to the present mandatory target population according to the EU regulation for the Member States' surveys on ICT usage and e-commerce in enterprises.

It is optional for the EU countries to also include micro enterprises with 1-4 and/or 5-9 employees. After one or more years of experience, also NSSRA could consider including micro enterprises, since these constitute a very essential part of the Armenian business demography.

4.3 Sampling

For the coming years a random stratified sample will be drawn. For the very first survey year, though, there is a chance that a cencus (total count) will be done. The calculation of sample sizes will take into account that it has to ensure reliable and representative results for all the estimates produced.

For stratification, strata as homogeneous as possible will be formed. Strata include at least the breakdowns for dissemination, but possibly more detailed stratification will be used in order to obtain even more efficiency. (Efficiency means here a higher reliability of the estimates for the same overall sample size).

Different proportion will be drawn from different strata. Among the largest enterprises, 100 per cent (or almost 100 per cent) of the enterprises will be chosen, while among smaller enterprises the proportion will be lower. A more elaborated optimization of the sample can be considered in future surveys as more survey information becomes available.

A census covering all enterprises in the target population could be desirable for the first year, in order to get a more complete picture. However, this requires additional resources for the data collection.

4.4 Error checks and quality control

Logical errors – e.g. conflicts in routing - should be corrected, possibly including re-contact with enterprises.

Imputation of missing items based on values from other respondents will as a main rule *not* be done, as this is not recommended in the EU methodology.

4.5 Weighting/grossing up procedures

For all qualitative variables (mainly yes/no questions) the observations are weighted by the *number of enterprises* in the stratum to which they belong. See Annex 5 for an example of the importance of the weighting procedure.

For quantitative variables (in general collected in percentage terms, e.g. percentage of persons employed using computers, percentage of turnover resulted from orders received via computer networks) observations will be weighted by the base variable of those percentages, i.e. by the *number of persons employed* if the variable is percentage of persons employed, by the *total turnover* if the variable is percentage of turnover, etc.

4.6 Dissemination

The categories for dissemination will be a total for Armenia and in addition breakdowns by size class and by industry (but not combined).

Breakdown by industry
The breakdown by industry will be finally decided after analysing the result of the pilot study. Probably the NACE-groups from the stratification will be aggregated into 4-5 groups.

Breakdown by size class
10-29 employees
30-49 employees
50-99 employees
100-249 employees
250 employees or more

Possible dissemination of survey results (statistical information)
- Press release – main results of surveys
- Basic information on the web-site (main tables)
- Detailed information in the database, ARMSTATBANK.AM
- Main information in monthly publication
- The yearly publication "Information technologies in Armenia" – overall information about ICT statistics and their surveys (can be together with ICT sector statistics like a separate section of publication)
- Special analysis according to needs or requests.

4.7 Questionnaire

For the pilot survey a questionnaire was developed including relevant EU variables, mainly from the 2011 survey. For the first full scale survey the same questionnaire, with only minor changes and necessary improvements, will be used.

New questions of specific interest might be added and questions that, after evaluation from the pilot results, were found not relevant or having too low quality, could be removed. However only necessary changes will be done and the total number of questions will not be increased in order to avoid negative impact on the quality.

Future revisions
The questionnaire will be changed over time, in order to adjust to the take up of new technologies. Within EU a new version of the questionnaire is developed every year, containing new questions as well as altering of the old questions. An annual update of contents is also the scenario for NSSRA.

As input, NSSRA will follow the developments of the EU questionnaires for the annual revision of the national survey. Also thematic questions from previous EU-questionnaires can be considered together with national designed questions.

NSSRA will also consult stake holders for input on user needs and technological expertise. In order to obtain time series a *set of core variables* will be decided and kept for a period of 5 years.

If micro enterprises will be included in future surveys, a reduced questionnaire will be used, where questions not relevant for small businesses are excluded.

4.8 Data collection method

The data collection method will be face-to-face interviews. In case the budget will not allow this, postal survey will be conducted. The addressee will be the ICT manager/ ICT responsible or the director of the enterprise.

4.9 Interviewer training

There will be training of the interviewers before starting the data collection. All questions will be presented to the interviewers and explained if there are uncertainties. A person with competence in the field of ICT could possibly function as instructor at the training to support the statistical personal when technical questions are asked by the interviewers.

4.10   Next step – time plan first survey

The aim is to conduct a full scale survey in 2013 on the condition of financing. Within EU the data collection period is the first quarter of the year. It is therefore recommended to start the data collection in Armenia as early as possible in the first survey year. Necessary activities for the first survey are:

Activity	Period	Comment
Decision on -data collection type -categories for dissemination -census or sample	Dec.-Jan.	
Updating contents - Review of questionnaire - Comments from stakeholders	Feb.	
Finalizing the questionnaire	Feb.	
Sample design/Draw sample	Feb.-March	
Preparing system for quality control checks and data entry	Feb.-March	
Approval by State Council of Statistics + Legal testing by Min. of Justice	March	Normally 3-4 weeks
Printing of questionnaires	March-April	
Training interviewers	End March - beg. April	Regional interviewers visit NSSRA
Data collection	April-May	
Debriefing with interviewers	May-June	
Data entry	June	
Error checks, quality control	June-July	
Re-contacting enterprises	June-July	
Calculations/weighting , grossing up	Aug.-Sep.	
Preparation of report (tables, charts, publication)	Oct.-Nov.	
Preparation of press release	Nov.	
Publishing	End Nov.	

Future annual process

For the following years it is recommended to set up an annual process of reviewing and planning - for example according to this program:

Activity	Period	Comment
Debriefing, experience from previous year.	November, year: t-1	
Consulting stakeholders , discussing users need for next year and checking current EU questionnaire.	Nov-Dec, year: t-1	EU Model questionnaire for year t decided in autumn year t-1
Questionnaire approved	February	
Sampling	January-February	
Data collection	March-April	
Dissemination	October-November	

Annex 1: Terms of Reference (F.6); 19–23 November 2012

Mandatory results of the component:
The mandatory results of component F is: "Enterprise and institution ICT pilot studies rolled out and fully executed; data published" *("pilot studies" replacing "surveys" from the contract text).*

Activity F.6   Review of the implementation

1. Purpose of activity
The purpose of the activity is to wrap up the work of the component, and to give direction for the future work in order to help ensure the sustainability of the component results.

2. Expected output of the activity
Mandatory result of the component fulfilled:
o   Review of the obtained results and of the project processes
o   Workshop for external stakeholders with discussion of the obtained results;
o   Drafting of a strategy document for the development of the Armenian ICT statistics;
o   Last input to the methodology for the regular survey on enterprises' ICT usage

3. Project Participants
Mr Gagik Anayan, Member of State Council on Statistics (*BC Component Leader*);
Ms Anahit Harutyunyan, Head of Trade and Other Services Statistics Division;
Ms Inga Baroyan, Main Specialist of Trade and Other Services Statistics Division;

Mr Martin Lundø, Chief Adviser, Business Development Division, Statistics Denmark *(MS Component Leader);*
Ms Ingrid Persson, Advisor, Economic Statistics Department, Statistics Sweden.

External Stakeholders taking part in the activity
Enterprise Incubator
Ministry of Economic Affairs
Regulatory Commission

4. Meeting Programme for MS Expert: 19-23 November 2012

Time	Place	Event	Purpose / detail
Monday, 19 Nov. Morning	Congress Hotel	Meeting with RTA	To discuss the programme of the week
Afternoon	NSSRA	Meeting with BC Component Leader	Current status. BC Component Leader on developments and internal follow up since F4.2 (September 2012).
Tuesday, 20 Nov. Morning	NSSRA	Meeting with BC Experts	Preparations for afternoon meeting
Afternoon	NSSRA	Workshop with stakeholders	Presentation and discussion of Pilot Study Report on ICT usage in Armenian enterprises and Institutions. *Presentations:* 1.The Pilot Study Report (BC Experts) 2.Strategy for ICT Statistics (MS Experts)
Wednesday, 21 Nov. Morning	NSSRA	Meeting with BC Experts	Follow-up on the workshop - 1: *Consequences for the final version of the pilot study report, and for the future survey.*
Afternoon	NSSRA	Meeting with BC Experts	Follow-up on the workshop – 2: *Consequences for the future methodology – i.e. questionnaire and instructions*
Thursday, 22 Nov. Morning	NSSRA	Meeting with BC Experts	Drafting of 3-5 year strategy document for the Armenian ICT statistics
	NSSRA	Meeting with BC Experts	Discussion of possible press release on the ICT usage in Ministries of RA
Friday, 23 Nov. Morning	NSSRA	Ad-hoc meetings	Work on the mission report, and preparations for debriefing.
Afternoon	NSSRA	Debriefing with BC Project Leader	Conclusions and recommendations.

Annex 3: Persons met

List of all the people met during the mission.
To be updated during the translation process

Gagik Ananyan	Member of State Council on Statistics
Anahit Safyan, Division Head	International statistical cooperation division
Anahit Harutyunyan, Division Head	Trade and Other services division
Inga Baroyan, Main specialist	Trade and Other services division
Arevik Saghumyan, Leading specialist	Trade and Other services division
Gayane Vardanyan, 1st category specialist	Trade and other services division
Anahit Araqelyan,1st category specialist	Trade and Other services division
Anna Antonyan, 1st category specialist	Trade and Other services division
Heghine Babayan, Main specialist	Trade and Other services division
Armine Shaboyan, Main Specialist	Methodology Division
Garik Khachatryan, Main specialist	Business Register Division
Laert Harutyunyan, Division Head	Business Register Division

Annex 4: Press Release on the ICT usage in Armenian ministries
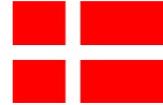
National Statistical Service of the Republic of Armenia

PRESS RELEASE

Yerevan

06/12/2012

Pilot study on usage of Information Communication Technologies (ICT) in Armenian ministries in the framework of EU Twinning Project

The 2 year project "Forwarding Armenian Statistics through Twinning" was launched in January 2011 as part of the European Union Neighborhood Partnership Instrument programme.

One of the components of the project is related with Information Communication Technologies Statistics within the scope of which, with the assistance of EU experts from Denmark, Lithuania and Sweden, a pilot study has been implemented in 2012 in Armenian ministries by National Statistical Service of RA (NSS RA), with the purpose of preparing statistics on ICT usage by ministries that will be the basis for future surveys in other parts of the public sector. The relevant questionnaire was also developed for Armenian enterprises and pilot tested.

ICT usage in Armenian ministries

Pilot study was implemented among 17 Armenian ministries (out of 18) which ensured the representativeness of pilot study.

The analysis of the following indicators was done within pilot study: usage of computers with its types, usage of local area network, electronic access to personal human recourses services, Internet connection types, internet connection with maximum contracted download speed, public services types rendered by ministries, availability of official web page, etc.

Based on the pilot study results, all Armenian ministries used computers (e.g. laptops, notebooks, net-tops), personal digital assistants (PDA) in January 2012, and 89 per cent of the employees in the Ministries used computers.

94 per cent of the ministries had internal computer network, for example LAN in one building or in buildings located close to each other.

59 per cent of the ministries included in the survey had access to at least one kind of personal human resources services electronically, ex working time recording system, request annual leave, view or download pay slips, or other services in January 2012.

All ministries had internet connection in January 2012. 76 per cent of the employees had internet connection. 88 per cent of the ministries had other fixed internet connection, e.g. cable, fiber optic, leased line (EEL or EEL at level 1 and ATM at level 2), Frame Relay, Metro-Ethernet, PLC–Power line, etc.
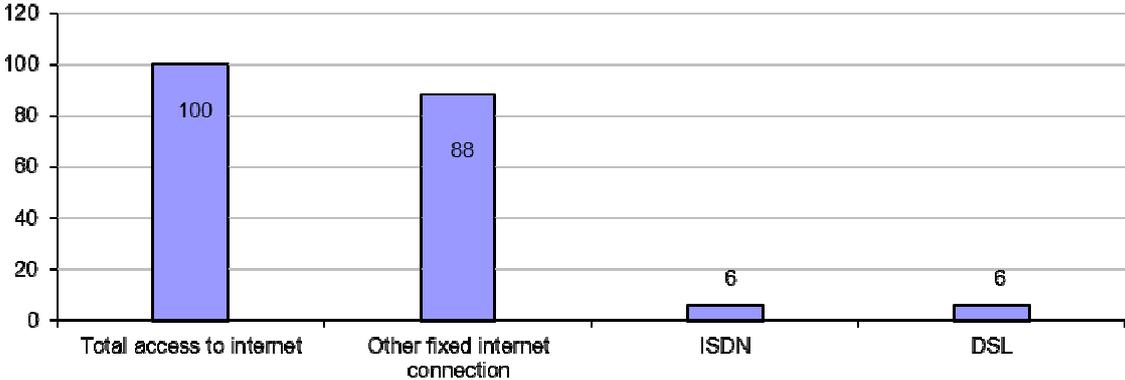
71 per cent of the ministries reported that their maximum contracted download speed was 2.1 Ambit/s-10.0 Ambit/s.
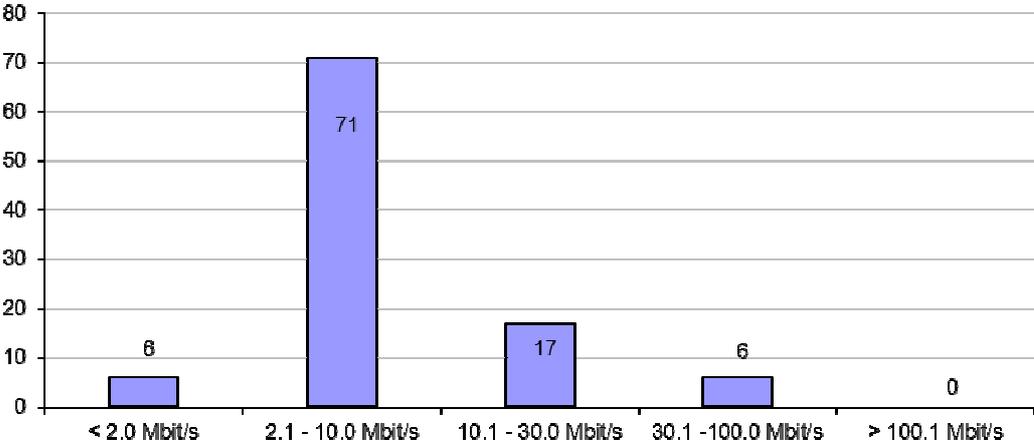
94 per cent of the ministries were rendered public services by direct connection (visit), traditional post and web site. The specific weight for the services provided by Internet connection is the lowest and equals to 18 per cent (3 ministries).
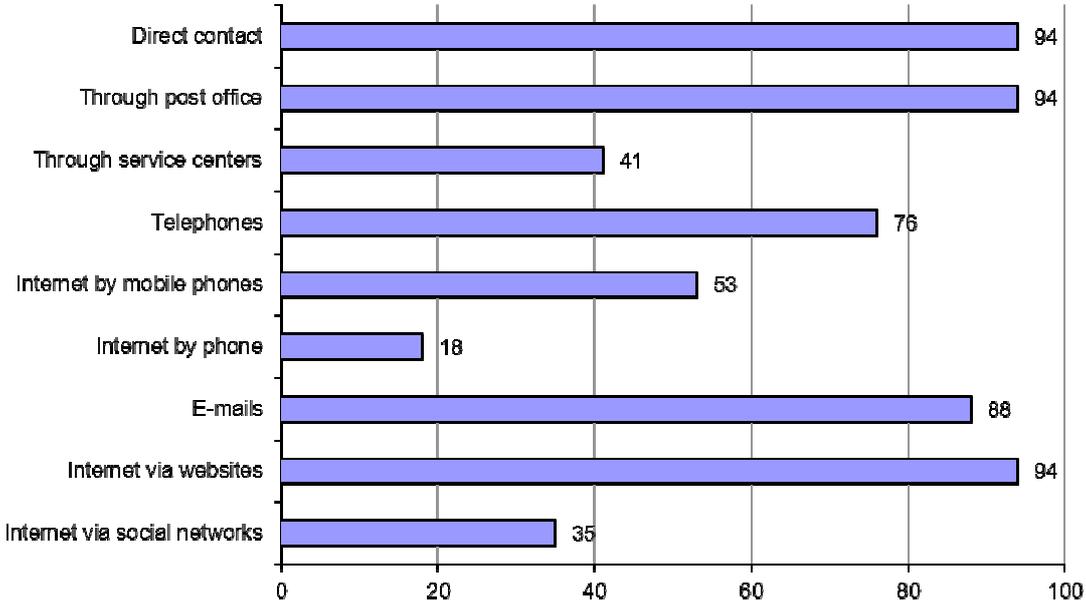
All ministries included in the pilot study had official web-site. It should be noted that all web sites featured the following sections *«Organization structure and contacts»*, *«Information about the activities implemented by the institution»*, *«Relevant news on the institution's activities»*. 87 per cent of the ministries web-sites also had a section with *«Information about provision of the services»*.

71 per cent of the ministries used digital signature in any message using encryption methods that assure the authenticity and integrity of the message (uniquely linked to and capable of identifying the signatory and where any subsequent change to the message is detectable.

Contact Information
☎ *523 356 Statistical Information Dissemination and Marketing Division*
☎ *587 623 Trade and Other Services*

Annex 5. The importance of weighting - example

This example demonstrates the importance of weighting, i.e. the difference between the results between weighted and unweighted results.

POPULATION	Size class			
Industry	10-49	50-249	250-	Sum
A	60	20	10	90
B	20	40	10	70
Total	**80**	**60**	**20**	**160**

SAMPLE	Size class			
Industry	10-49	50-249	250-	Sum
A	10	10	5	25
B	3	8	10	21
Sum	13	18	15	46

Weights	Size class		
Industry	10-49	50-249	250-
A	6,00	2,00	2,00
B	6,67	5,00	1,00

Q1 - YES	Size class			
Industry	10-49	50-249	250-	Sum
A	1	7	4	12
B	1	2	7	10
Sum	2	9	11	22

Q1 - Yes, weighted	Size class			
Industry	10-49	50-249	250-	Sum
A	6,00	14,00	8,00	28,00
B	6,67	10,00	7,00	23,67
Sum	12,67	24,00	15,00	51,67

RESULTS BY INDUSTRY	Population	Weighted YES	**in percent**	Non-weighted YES	
A	90	28,00	**31%**	12	48%
B	70	23,67	**34%**	10	48%

RESULTS BY SIZE CLASS	Population	Weighted YES	**in percent**	Non-weighted YES	
10-49	80	12,67	**16%**	2	15%
50-249	60	24,00	**40%**	9	50%
250-	20	15,00	**75%**	11	73%