



**EU Twinning Project**

**Forwarding Armenian Statistics through Twinning**

**AM09/ENP-PCA/TP/04**

**MISSION REPORT**

on

**ICT SOCIETY STATISTICS**

**Activity F4.2: Optimization of sampling**

Mission carried out by  
Gediminas Samuolis (Statistics Lithuania)

Armenia 24–27 September 2012

Final version

	 <b>STATISTICS DENMARK</b>	 <b>STATISTICS LITHUANIA</b>
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## 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**

NSSRA has performed a pilot survey of ICT usage in a random stratified sample of 100 enterprises and in 17 Armenian ministries (out of 18). The surveys were conducted via self-administered questionnaires.

The enterprise results should only be used for methodological analysis, due to big random variance. The institution part of the survey consists of a total count of ministries use of ICT and may be used for statistical purposes for a broader group of users than the project stakeholders.

In the future surveys the questionnaire should follow the principles of the EU survey, using variables from the EU model questionnaire.

The Pilot Study Report and a draft strategy of an ICT usage survey should be the final result of the component F as input to a future strategy. Steps before next mission: NSSRA will produce a second draft Pilot Study Report (before 15 October 2012).

## **2. General comments**

This main part of the mission report was prepared by the MS Expert during the mission to NSSRA. The MS Experts would like to thank the individuals met during the mission much for providing valuable information about the current and future situation and for their kind support during the stay.

The overall purpose and mandatory result for component F, Information Society was, firstly, to roll out and publish results from a survey on ICT usage by enterprises and institutions before the Twinning project ends, and secondly to train NSSRA staff on issues related to statistics for the information society. However, as for the first result, this has been changed to development of the full methodology and implementation of pilot studies.

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

## **3. Assessment and results**

### **3.1 Optimization of sampling**

The stratification should be by economic activity and by number of persons employed. The sampling design and the resulting sample size should be appropriate for obtaining accurate, reliable and representative results on the survey characteristics. This objective should be achieved for the overall proportions as well as for the proportions relating to the different subgroups of the population.

The estimated standard error for any indicator/variable (be it a proportion or a total) should not exceed 2 percentage points for the overall population and should not exceed 5 percentage points for the different subgroups of the population.

Sample plan for regular survey - the problems are:

- The differences between the ICT usage in the 11 regions expectedly are very big
- The enterprise demography is very concentrated around the capital, Yerevan and many “thin” or empty cells in the regional stratified population

The enterprise demography is very concentrated around the Yerevan and the survey results could distinguish between the capital and the rest of the country. But in other regions away from Yerevan only a small number of enterprises exist (with 10 and more employees), and to produce statistics on each region is problematic due to the confidentiality of data.

## **Decision on the sampling**

Based on the material from the business register (size groups, NACE, regions), six different scenarios were presented during a workshop (participants from Trade and Other Services, Methodology, and Business Register divisions). The scenarios are presented in Annex 4.

After the workshop and discussions with the BC Component Leader, two alternatives remain with the following limitations:

1. the most probable, especially in the first survey year – the sample only at national level (as required by the EU legislation and applicable in, among most EU countries, Lithuania and in Denmark).
2. Sample for Yerevan (by size groups and by NACE 2) and all together regions (only by NACE 2 breakdown)

The final decision should be taken after Meeting with Stakeholders.

The MSE expert's recommendations for sampling:

- The sample should be a stratified random sample made by use of register-based data;
- The number of persons employed and economy activity (NACE rev. 2) should be used to stratify the population;
- All enterprises from small cells or groups should be included in the sample ("small" for example defined as having less than 15 units – must be decided by NSSRA);
- Within every NACE rev. 2 group, the strata of enterprises should be formed by the number of employees, i.e. size groups;
- The Neyman optimal allocation procedure (or other possibilities according to recommendation of NSSRA Methodology division) should be used to determine the sample size for each stratum;
- In each stratum simple random sampling should be used.

## **3.2 Pilot Study Report**

The Pilot Study Report will be the final result of the component F together with a draft strategy of an ICT usage survey and should provide valuable input to a strategy for future ICT usage surveys. The report should present the results from the pilot surveys including methodological experiences and considerations for a future survey.

### **Use of results**

It should be made explicitly clear in the publication that the enterprise results are only for methodological analysis because the small sample has too big random variance to be used as statistical results. However, the institution part of the survey consists of a total count of ministries' use of ICT. It can thus be investigated whether these results could have interest for a broader group of users than the project stakeholders.

### **Suggested structure**

The suggested structure of the Pilot Study Report was outlined in the F4.1 report. Some of the questions that should be elaborated in the report's chapter 3 are presented in Annex 5. Furthermore, and most importantly, the very detailed problems to each single question on the questionnaires that arose during the pilot studies should be discussed – with focus on the solution to the problems in the light of the future surveys.

The comments on 1-4 sections of the Pilot Study Report was presented and accepted by NSSRA during the mission.

### **Proposal to shorten section 4 of Pilot Study Report**

The MS Expert gave the following, concrete recommendation for a short chapter 4 in the pilot study report on the results (which may, for the mini be used later on in a press release):

1. PC and internet in enterprise
2. Type of internet connection
3. Websites and their possibilities
4. Purposes of communication with public authorities via the Internet
5. Electronic data exchange between enterprises
6. Enterprises with ICT systems for e-business
7. E-commerce via electronic networks

This proposal (see Annex 6) to shorten section 4 of the pilot study report was presented to NSSRA.

### **3.3. Recommendations for future ICT usage surveys**

The experiences and results from pilot study survey in enterprises were discussed together with Trade and Other Services Division and the BC Component Leader. In the future surveys, the questionnaire should still follow the principles of the EU survey, using variables from the EU model questionnaire. However, issues that are not relevant to Armenia could be eliminated, and instead focus could be establishing time series for some of the most important indicators.

Examples of problematic questions and logical relations between questions are given in Annex 7.

### **3.4. Strategy for future ICT usage statistics**

The MS Expert recommends that the final result of component F, besides the development of the ICT usage statistics methodology, will be a strategy for future ICT usage surveys. Possible elements of such a strategy will be presented for stakeholders in the Pilot Study Report. The stakeholders will have the possibility to comment on a joint workshop during the last mission F.6, which will provide input for the strategy.

During the mission the draft version of 5 chapter "From pilot studies to regular surveys" of Pilot Study report was developed, which is presented in Annex 8.

## **4. Action before next activity**

The pilot study report will be finalized before the review mission, F.6. The report should provide input for the discussion of a 3 years strategy for the development of the ICT surveys in Armenia.

The RTA presented a suggestion for an updated roadmap for the ICT Statistics component which were discussed during the mission and agreed by NSSRA. The plan focuses on the last missions and the actions that need to be taken by NSSRA before and between them:

- Next draft of the pilot study report should be prepared 15 October and translated by 19 October
- Finish the Pilot Study Report in order to send out to stakeholders before 9 November
- Invitation to stakeholders for final workshop during F6 in November 2012 (20 November (Tuesday) or 21 November (Wednesday)).

## Annexes

### Annex 1: Terms of Reference (F4.2); 24–27 September 2012

Component A	Quality Management
Component B	Business Register, Structural Business Survey, and Respondent Burden
Component C	Improvement of the Exhaustiveness of GDP
Component D	Agricultural Census
Component E	Harmonized Consumer Price Index
<b>Component F</b>	<b>ICT Society</b>

#### **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 F4.2 Optimization of sampling**

##### **1. Purpose of activity**

The purpose of the activity is to decide on the level of stratification and size of the sample for the survey on enterprises’ ICT usage.

##### **2. Expected output of the activity**

The expected outputs of the activity are:

- Discussion and further input to the report on the experiences and results from the pilot studies;
- Discussion of the regional level of detail in the future dissemination of enterprises’ ICT usage;
- Analysis of the enterprises in the business register;
- Decision on the sampling and stratification issues.

##### **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. Gediminas Samuolis, Head of Knowledge Economy Division, Statistics Lithuania.

## Annex 2: Programme for the mission

<b>Time</b>	<b>Place</b>	<b>Event</b>	<b>Purpose / detail</b>
Monday, 24 Sept. 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 F4.1 (May 2012). Discussion of possible dissemination levels.
Tuesday, 25 Sept. Morning	NSSRA	Workshop	Analysis of the business demography. Participation from Trade and Other Services, Methodology, and Business Register divisions. Consequences for the sample for the survey on ICT usage in enterprises – in the light of the relevant dissemination level.
Afternoon	NSSRA	Meeting with Trade and Other Services division	Further discussions on the sampling issue, including the possibility of different scenarios for the first year of the survey vs. the following years
	NSSRA	Meeting with Trade and Other Services division	Discussion of the draft report on the pilot studies on ICT usage in enterprises and public sector
Wednesday, 26 Sept. Morning	NSSRA	Meeting with RTA	Drafting a work plan for the rest of the project period
	NSSRA	Meeting with Trade and Other Services division	Discussion of work plan for the rest of the project period
Afternoon	NSSRA	Meeting with BC Component Leader	Discussion of the preliminary conclusions concerning 1.The work on the pilot study report 2.Sampling for the future survey on ICT usage in enterprises 3.Should NSSRA conduct surveys on ICT usage in the public sector? 4.The work plan for the rest of the project period
Thursday, 27 Sept. Morning	NSSRA	Ad-hoc meetings	Work on the mission report, and preparations for debriefing.
Afternoon	NSSRA	Debriefing with BC Project Leader	Conclusions and recommendations. Consequences for the next mission and implied work programme for BC Experts

### **Annex 3: Persons met**

*List of all the people met during the mission.*

#### **Need to update**

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: Survey and Sampling alternatives

A round table with participation of Trade and Other Services, Business Register and Methodological divisions of NSSRA was held with the expected output being:

- Discussion of the regional level of detail in the future dissemination of enterprises' ICT usage;
- Analysis of the enterprises in the business register;
- Decision on the sampling and stratification issues.

About stratification and sample:

The stratification should be by economic activity and by number of persons employed. The sampling design and the resulting sample size should be appropriate for obtaining accurate, reliable and representative results on the survey characteristics. This objective should be achieved for the overall proportions as well as for the proportions relating to the different subgroups of the population. The estimated standard error for any indicator/variable (be it a proportion or a total) should not exceed 2 percentage points for the overall population and should not exceed 5 percentage points for the different subgroups of the population.

Sample plan for future surveys - the problems are:

- The differences between the ICT usage in the 11 regions expectedly are very big
- The enterprise demography is very concentrated around the capital, Yerevan and many “thin” or empty cells in the regional stratified population

The enterprise demography is very concentrated around Yerevan, and the survey results as a minimum possibly should distinguish between the capital and the rest of the country. But in other regions there is only few enterprises (with 10 or more employees), and to produce statistics on each region is problematic due to confidentiality of data

Yerevan and sum of the other regions:

	Population in Yerevan						Sum of population in Regions					
	10-29	30-49	50-99	100-249	250+	SUM	10-29	30-49	50-99	100-249	250+	SUM
<b>C</b>	275	52	43	35	17	422	159	46	33	17	14	269
<b>D</b>	7	2			5	14	28	2	2	1	2	35
<b>E</b>	3	2	2	6	4	17	20	5	1	2	1	29
<b>F</b>	103	28	21	19	7	178	93	24	30	21	1	169
<b>G</b>	403	66	42	29	11	551	207	17	13	5		242
<b>H</b>	137	32	25	11	9	214	51	17	12	1	3	84
<b>I</b>	156	30	18	5	1	210	36	8	2			46
<b>J</b>	76	27	21	5	6	135	17	3	2	1		23
<b>L</b>	50	15	10	2	1	78	4	1		2		7
<b>69-74</b>	104	21	23	19	2	169	16		2	2		20
<b>N</b>	58	18	9	11	3	99	13	3	2	1		19
<b>95.1</b>	1	1				2						0
<b>Total</b>	1373	294	214	142	66	2089	644	126	99	53	21	943

## SURVEY AND SAMPLING ALTERNATIVES:

### Alternative 1: Full scale survey (census)

Stratification by *Main Economic Activity*" (in terms of NACE 2) and *"Average Number of Persons Employed"*

NACE	Number of employees					SUM
	10-29	30-49	50-99	100-249	250+	
C	434	98	76	52	31	691
D	35	4	2	1	7	49
E	23	7	3	8	5	46
F	196	52	51	40	8	347
G	610	83	55	34	11	793
H	188	49	37	12	12	298
I	192	38	20	5	1	256
J	93	30	23	6	6	158
L	54	16	10	4	1	85
69-74	120	21	25	21	2	189
N	71	21	11	12	3	118
95.1	1	1	-	-	-	2
<b>Total</b>	2,017	420	313	195	87	3,032

A full scale survey would be a good choice for the first year's survey, because it provides a good base for the following years' sample surveys. The sample size would be 3,032 enterprises (according to demography information from the statistical business register of NSSRA).

However, this is a rather expensive solution. Nevertheless, there is a problem to produce statistics on each region because of confidentiality issues – there are many cells with 1-2 enterprises.

### Alternative 2. Sample by main economic activity and enterprise size

The best way to reduce the cost of the survey and the respond burden is through a sample survey. If only one sample (without regional distribution) is taken with stratification by economic activity and size (average number of employees), the number of enterprises in the sample is relatively small:

NACE	Number of employees					SUM
	10-29	30-49	50-99	100-249	250+	
C	109	25	19	13	8	173
D	9	4	2	1	7	23
E	6	7	3	8	5	29
F	49	13	13	10	8	93
G	153	21	14	9	11	207
H	47	12	9	12	12	93
I	48	10	5	5	1	69
J	23	8	6	6	6	49
L	14	4	10	4	1	33
69-74	30	5	6	5	2	49
N	18	5	11	12	3	49
95.1	1	1	0	0	0	2
<b>Total</b>	505	114	98	85	64	865

The sample size will be up to 900 enterprises if all enterprises are selected from small groups, defined as groups (combinations of NACE rev.2 and size) with less than 15 units), and else 25 per cent of the enterprises are selected within each group. Still, there is not possibility to have regional statistics.

**Alternative 3. Two separate survey samples – sample from Yerevan and full scale survey other regions (no regional distribution).**

	Sample of Yerevan						Sum of population in Regions					
	10-29	30-49	50-99	100-249	250+	SUM	10-29	30-49	50-99	100-249	250+	SUM
<b>C</b>	69	13	11	9	4	106	159	46	33	17	14	269
<b>D</b>	7	2	0	0	5	14	28	2	2	1	2	35
<b>E</b>	3	2	2	6	4	17	20	5	1	2	1	29
<b>F</b>	26	7	5	5	7	50	93	24	30	21	1	169
<b>G</b>	101	17	11	7	11	146	207	17	13	5		242
<b>H</b>	34	8	6	11	9	69	51	17	12	1	3	84
<b>I</b>	39	8	5	5	1	57	36	8	2			46
<b>J</b>	19	7	5	5	6	42	17	3	2	1		23
<b>L</b>	13	15	10	2	1	41	4	1		2		7
<b>69-74</b>	26	5	6	5	2	44	16		2	2		20
<b>N</b>	15	5	9	11	3	42	13	3	2	1		19
<b>95.1</b>	1	1	0	0	0	2						0
<b>Total</b>	352	89	69	66	53	628	644	126	99	53	21	943

This alternative would result in statistics on enterprises' ICT usage in Yerevan and in other regions. Still, there is a problem with the regions (about 15 groups empty; 20 groups with 1 or 2 enterprises). The sample size would be close to 1,600 enterprises.

**Alternative 4. Two separate survey samples – sample from Yerevan and sample in other regions (without regional distribution)**

	Sample of Yerevan						Sample of Regions					
	10-29	30-49	50-99	100-249	250+	SUM	10-29	30-49	50-99	100-249	250+	SUM
<b>C</b>	69	13	11	9	4	106	40	12	8	4	14	78
<b>D</b>	7	2	0	0	5	14	7	2	2	1	2	14
<b>E</b>	3	2	2	6	4	17	5	5	1	2	1	14
<b>F</b>	26	7	5	5	7	50	23	6	8	5	1	43
<b>G</b>	101	17	11	7	11	146	52	4	13	5		74
<b>H</b>	34	8	6	11	9	69	13	4	12	1	3	33
<b>I</b>	39	8	5	5	1	57	9	8	2			19
<b>J</b>	19	7	5	5	6	42	4	3	2	1		10
<b>L</b>	13	15	10	2	1	41	4	1		2		7
<b>69-74</b>	26	5	6	5	2	44	4		2	2		8
<b>N</b>	15	5	9	11	3	42	13	3	2	1		19
<b>95.1</b>	1	1				2						
<b>Total</b>	352	89	69	66	53	628	174	48	52	25	21	319

This would reduce the sample size to close to 950 enterprises. The problem with the regions remains, i.e. there are many groups with only 1 or 2 enterprises.

**Alternative 5. Two separate survey samples – sample from Yerevan and sample in other regions (without regional distribution), by economic activity or by number of employees.**

The 4<sup>th</sup> alternative can be implemented without regional stratification by economic activities or without enterprises size class. In this case, small groups are avoided:

**Alternative 5.1 Sample of Yerevan and sample in regions only by economic activities:**

	Sample of Yerevan						Sum of Regions
	10-29	30-49	50-99	100-249	250+	SUM	Sample total
<b>C</b>	69	13	11	9	4	106	67
<b>D</b>	7	2	0	0	5	14	9
<b>E</b>	3	2	2	6	4	17	7
<b>F</b>	26	7	5	5	7	50	42
<b>G</b>	101	17	11	7	11	146	61
<b>H</b>	34	8	6	11	9	69	21
<b>I</b>	39	8	5	5	1	57	12
<b>J</b>	19	7	5	5	6	42	6
<b>L</b>	13	15	10	2	1	41	7
<b>69-74</b>	26	5	6	5	2	44	5
<b>N</b>	15	5	9	11	3	42	5
<b>95.1</b>	1	1	0	0	0	2	0
<b>Total</b>	352	89	69	66	53	628	241

Alternative 5.1 would give a sample size at close to 900 enterprises.

**Alternative 5.2 Sample of Yerevan and sample in regions only by enterprise size:**

	Yerevan						Sum of Regions					
	10-29	30-49	50-99	100-249	250+	SUM	10-29	30-49	50-99	100-249	250+	SUM
<b>Total</b>	69	13	11	9	4	106	43	12	13	6	5	80
<b>C</b>	7	2	0	0	5	14						
<b>D</b>	3	2	2	6	4	17						
<b>E</b>	26	7	5	5	7	50						
<b>F</b>	101	17	11	7	11	146						
<b>G</b>	34	8	6	11	9	69						
<b>H</b>	39	8	5	5	1	57						
<b>I</b>	19	7	5	5	6	42						
<b>J</b>	13	15	10	2	1	41						
<b>L</b>	26	5	6	5	2	44						
<b>69-74</b>	15	5	9	11	3	42						
<b>N</b>	1	1	0	0	0	2						
<b>95.1</b>	352	89	69	66	53	628						

Alternative 5.2 would give a sample size of a little more than 700 enterprises.

**Alternative 6. Sample of Yerevan and sample in each region without distribution by economic activities and enterprise size**

	Yerevan						Aragatzotn	Ararat	Armavir	Gegarkunik	Lory	Kotayk	Shirak	Syuniq	Vayoc Dzor	Tavush	
	10-29	30-49	50-99	100-249	250+	SUM	Total in each region										SUM
							49	120	71	58	127	220	103	97	43	55	943
<b>C</b>	69	13	11	9	4	106											
<b>D</b>	7	2	0	0	5	14											
<b>E</b>	3	2	2	6	4	17											
<b>F</b>	26	7	5	5	7	50											
<b>G</b>	101	17	11	7	11	146											
<b>H</b>	34	8	6	11	9	69											
<b>I</b>	39	8	5	5	1	57											
<b>J</b>	19	7	5	5	6	42											
<b>L</b>	13	15	10	2	1	41											
<b>69-74</b>	26	5	6	5	2	44											
<b>N</b>	15	5	9	11	3	42											
<b>95.1</b>	1	1	0	0	0	2											
<b>Total</b>	352	89	69	66	53	628	12	30	18	15	32	55	26	24	11	14	236

The sample size would be up to 700 enterprises.

**Decision on the sampling**

Six different scenarios based on the material from the business register (size groups, NACE, regions) have been presented on workshop (participants from Trade and Other Services, Methodology, and Business Register divisions). After workshop and discussion with BC Component Leader, two alternatives remain with the following limitations:

1. the most probable, especially in the first survey year – the sample only at national level (as required by the EU legislation and applicable in Lithuania and in Denmark).
2. The second alternative - sample for Yerevan (by size groups and by NACE 2) and all together other regions (only by NACE 2 breakdown).

The final decision should be taken after Meeting with Stakeholders.

***The sampling design and sampling methods in Lithuania***

The sample is a stratified random sample made by use of register-based data. The number of persons employed and economy activity were used to stratify the population. There were 28 NACE Rev. 2 groups and 3 enterprise size groups (10- 49, 50 - 249, and 250 +).

All enterprises from small groups (less than 20 units) by NACE Rev 2 activities and number of persons employed groups were included into the sample. Within every NACE Rev 2 group the strata of enterprises were formed by number of persons employed groups. Then the Neyman optimal allocation (with variable number of persons employed) was used for determination of the sample size for each stratum specified. In each stratum simple random sampling was used. The sample was designed with no reference to other surveys. The final number of strata is 80.

## **Annex 5: Suggested structure of Pilot Study Report**

**(Draft version 0.3)**

1. Background *(1-2 pages)*
  - a. General introduction
  - b. The Twinning project and EU regulations on ICT statistics
  - c. Purpose of pilot studies on ICT usage in Armenia
2. Methodology *(3-4 pages)*
  - a. Population and sampling
  - b. Overall introduction of questionnaires (questionnaires in annexes)
  - c. Data collection method
3. Experiences from pilot studies *(7 from enterprises survey, 5 – from institutions)*
  - a. General impressions
  - b. Problems related to non-response
  - c. Respondent feedback – enterprises and institutions

Problem type 1

Problem type 2

4. Analysis of ICT usage in Armenia
  - a. Enterprises – selected tables and charts (7 pages)
  - b. Institutions – selected tables and charts (4 pages)
5. From pilot studies to regular surveys *(5pages)*

Annexes

- a. Questionnaire, enterprises
- b. Questionnaire, institutions
- c. Instructions and explanations
- d. Detailed analysis of indicators

## **Annex 6: Proposal for Pilot Study Report, chapter 4. “Analysis of pilot study results”**

Recommendation for a short report on the survey results (which may be presented in a pilot study in Chapter 4, or, partly, as a press release):

1. PC and internet in enterprise
2. Type of internet connection
3. Websites and their possibilities
4. Purposes of communication with public authorities via the Internet
5. Electronic data exchange between enterprises
6. Enterprises with ICT systems for e-business
7. E-commerce via electronic networks

One chart for each of the above topics could be presented in chapter 4 of the pilot study report. In addition, charts related to the public sector should be chosen.

## **Annex 7: Discussion on problematic questions and logical control**

Some recommendations from Eurostat Methodological manual:

### **1. Use computers, have computers or have another enterprise use for you**

The term "use" does not refer to the ownership of such goods and infrastructure. For example computers may belong to the enterprise, may be leased or shared with another organisation. However, in the case where computers etc. are used by the responding enterprise, but provided or maintained by another enterprise, it is still considered as used by the responding enterprise.

Additionally, enterprises often buy ICT services or services which relate to the ICT use (like accounting). In cases where ICT services or other services which include ICT use are provided totally by another enterprise and the responding enterprise itself is not using ICT for that function, then it is not counted as use of ICT of the responding enterprise.

In some cases there will be a mixture of ICT usage by the responding enterprise and the ICT service provider (another enterprise). In these cases it should be made clear from the question what kind of activities will be counted as ICT usage of the responding enterprise.

### **2. Did your enterprise have a Web Site or Home Page,**

Some examples on the interpretation of special cases: In some questions the ICT involvement of the enterprise is not about the ICT usage, but rather that the enterprise has or offers some digital solutions. One important example is the question about having a website, where the question is about having, not using, and the subject is the solution that is offered to customers etc. regardless of how the website is technically maintained.

This observation variable doesn't refer specifically to the ownership of the website, but to the use of a website by the enterprise to present its "business". It includes not only the existence of a website which is located on servers belonging to the enterprise or are located at one of the enterprise's sites, but also third party websites (e.g. one of the group of enterprises to which it belongs).

The main issue about having a website is about control and responsibility of the contents in a separate area in the web. Web-pages of an enterprise can be maintained and designed by a service provider, but if the responding enterprise "owns" the contents, it is its own website. However, not all presence in web means that the respondent has a website. Presence in certain service catalogues "yellow pages", address lists etc. are not counted as the enterprise's website. E-commerce systems can also be provided and maintained by service providers. Similarly to the case of the website, if it is the responding enterprise's e-commerce facility, the responding enterprise has control over the content of the site and it is the one who is selling and the owner of the products sold, then it is this respondent's e-commerce. Still a special case is Internet market places, where enterprises can sell their products. In this case the respondent does not own or control the site, but it is controlling the sale and owning the products to be sold and therefore it is their e-commerce (if e-commerce definition is valid in the situation).

### **3. Use of the Internet in contact with public authorities**

As the competence of the government or the "public authorities" differs strongly from one country to another, the concept has been kept as wide as possible: public authorities refer to both public services and administration activities. While "administration" refers to obligation and rights one has as a citizen or as an enterprise in activity in the country (the so-called red tape), public services can refer to non-administrative tasks or competences of government bodies, e.g. offering the public library's catalogue on-line.

The public authorities can be at national or regional level, but also at the level of cities or municipalities. They can even be "semi-governmental", e.g. public libraries, hospitals, universities, etc.

Need to note that "interaction" in this question is both one and two-directional, from simple obtaining information up to complete case handling electronically. Requests for clarifications or for obtaining information addressed by e-mail to public authorities is not in the scope of any of the responses.

Internet connection and speed:

(1)	(2)						(3)
Speed	Data Transmission Technology (in broad terms)						Question B3
(Mbps)	ISDN/Dialup	DSL	VDSL	Cable DOCSIS 2.0	Cable DOCSIS 3.0	FTTH/B	(demand) Model
							Questionnaire
120					120 Mbit/s	120 Mbit/s	>= 100 Mbit/s
100							
50			50 Mbit/s				[30-100) Mbit/s
40				40 Mbit/s			
30							
25		25 Mbit/s					[10-30) Mbit/s
20					20 Mbit/s		
10			10 Mbit/s				
5						5 Mbit/s	[2-10) Mbit/s
2							
1							
<= 0,5	144 kbit/s	0,5 Mbit/s		0,5 Mbit/s			< 2 Mbit/s

Source: DG INFSO

## **Annex 8: Draft version of Pilot Study Report chapter 5**

### ***5. From pilot studies to regular surveys***

The purposes of the regular surveys on ICT usage are to produce statistics on ICT usage in enterprises comparable to EU statistics and, as a possible supplement, to produce statistics on ICT usage in the public sector for national needs. ICT statistics are very dynamic and questions in the survey can be changed from year to year according to politicians and user needs.

Recommendations are concentrated on ICT usage survey in enterprises but can be adapted to institutional sector too. Before deciding a plan for future measurement (surveys), need to be taking in opinion next steps:

#### ***A statistical product***

A statistical product is described by the precise definition of the statistical information to be produced. Statistical measures are used to summarize the values for a specific variable for all statistical units in a specific group. Such measures can take the form of aggregates (e.g. total number of “Yes” answers on a specific question) or indicators (e.g. percentage of “Yes” answers).

Aggregates can be compiled for the total population or for the different subpopulations defined by the background variables (e.g. NACE category or size class) or for sub-populations defined conditionally on the answers of other study variables (e.g. broadband users versus non broadband users). To obtain indicators (proportions, percentages, ratio, etc.), the aggregates need to be divided by the corresponding total population or subpopulation.

The needs for statistical products are, among others, assessed by politicians, business, and social needs.

#### ***Survey coverage and classification***

The coverage of the survey on ICT usage in Armenian enterprises could be similar to the surveys in the EU Member States, including enterprises with at least 10 employees. It is possible for NSSRA in later surveys to expand the coverage (e.g. include smaller enterprises than 10 employees) if it is considered relevant. The recommendation is to follow international classification of economic activities (NACE rev. 2) and grouping of enterprises according to size according to international practice (number of possible full-time employees).

The ICT survey on the public sector could cover different types of institutions: government, ministries, local municipalities, health care and other institutions. If resources are scarce, the survey could be implemented with a less than every year frequency, or the yearly surveys on ICT usage in the public sector could concentrate on different types of institutions.

#### ***Data collection method***

It is important to balance user needs with available resources and considerations for respondents’ burden. The need for resources is decisive for the choice of data collection method and the sample size. NSSRA thus needs to balance the available resources with the information requested by main users – including detail level and desired quality/certainty of the results. The below mentioned options are applicable for the data collection for the ICT usage survey according to international methodology and standards

- Data collection by interviewers.
- Data collection through sending the questionnaire by post.
- Data collection by e-mail.

#### ***Survey questionnaires***

The survey questionnaires should have a clear and logical structure. The use of filter questions is recommended to minimise respondents’ burden and the questionnaire should be accompanied by instructions, either to the enterprises (if a postal questionnaire), or to the interviewers with clear definitions and explanations of e.g. technological terms (questionnaires in annexes).

### ***The stratification and sample size***

A good choice for the first survey is to have a full-scale (census) survey. This will provide a good basis for the following year's sample survey. According to demography information from the statistical business register of NSSRA, the survey size will be up to 3,032 enterprises (2010 data). The enterprise demography is very concentrated around Yerevan, and the survey results possibly could be split between the capital and the rest of the country. In other regions, only a relatively small number of enterprises (with 10 and more employees) are located, and to produce statistics on each region is problematic, if not impossible, due to confidentiality of data. This could, partly, be helped by a census of all enterprises with more than 10 employees, with increasing costs.

Ultimately, the stratification and the sample size are decided by the level of dissemination and should be by economic activity and by number of persons employed. The sampling design and the resulting sample size should be designed in order to obtain accurate, reliable and representative results on the survey characteristics. This objective should be achieved for the overall proportions as well as for the proportions relating to the different subgroups of the population.

Six different scenarios based on the material from the business register (size groups, NACE, regions) have been presented during the Twinning project. Two alternatives are proposed to the future surveys with the following limitations:

1. A sample only at national level (as required by the EU legislation) with dissemination breakdown according to NACE 2 and size groups – this alternative may be the most likely, especially in the first sample survey year.
2. A sample for Yerevan (dissemination by enterprise size groups and by economic activities by NACE 2) and all other regions joined (dissemination of sum of regions only by NACE 2 breakdown).

The final decision should be taken in coordination with users' needs, and take into account both the available resources and considerations for respondents' burden.

- The MSE experts' recommendations for sampling;
- The sample should be a stratified random sample made by use of register-based data;
- The number of persons employed and economy activity should be used to stratify the population;
- All enterprises from small groups (combination of NACE rev. 2 and size class), defined as having less than 15 (must be decided by NSSRA) should be included into the sample;
- Within every NACE rev. 2 group the strata of enterprises should be formed by number of persons employed groups;
- The Neyman, or another way of making optimal allocation (with variable number of persons employed), should be used for determination of the sample size for each stratum specified;
- In each stratum simple random sampling should be used.

### ***Weighting results***

After finalizing data collection and data processing, results should be weighted by number of enterprises (raised to frame population) to correct for imbalances in the sample. The strata's from the sampling may be used also for the weighting with possible combinations of strata's with thin coverage. Quantitative variables in the e-commerce module related to sales/purchases should be weighted by total turnover/total purchases.

The estimated standard error for any indicator/variable (be it a proportion or a total) should not exceed 2 percentage points for the overall population and should not exceed 5 percentage points for to the different subgroups of the population. If the analysis shows larger standard errors, this may indicate that there are problems in the way the stratification of the population or the way the sample has been taken.

### ***Documentation and dissemination***

The documentation of the survey should include assessment of the reliability of results and comparisons of results with the EU surveys and compliance with EU methodology.

Possibilities to 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);
- Specialised analysis according to needs or requests.