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HiQSTEP PROJECT

Study on monitoring the Digital Economy and Society in the Eastern European Partner Countries

REGIONAL REPORT

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Abbreviations and acronyms

EU	European Union
EaP	Eastern Partnership
ICT	Information and Communication Technology
MS	Member State
ESS	European Statistical System
EEA	European Economic Area
EFTA	European Free Trade Association
OECD	Organisation for Economic Co-operation and Development
NSI	National statistical institutes
ECB	European Central Bank
ESSC	European Statistical System Committee
UNSC	United Nations Statistical Commission
IMF	International Monetary Fund
ESGAB	European Statistical Governance Advisory Board
HDM	Harmonizing Digital Markets
PSI	Public sector information

1. INTRODUCTION

The Digital Economy and Society Index (DESI) is a composite measure that examines Europe's digital performance. The DESI was first calculated in 2014, using statistics from 2013. It is one of the main analytical tools developed by DG CNECT to provide evidence-based input for the assessment of digital development in the EU as a whole as well as in Member States. The DESI aims to help EU countries identify areas requiring priority investments and action in order to create a truly Digital Single Market[1].

This report presents the results of a Study on monitoring the Digital Economy and Society in the Eastern Partnership Countries and evaluates the state of affairs in these countries in terms of the availability of data necessary to calculate the index based on the guidelines and recommendations of the OECD's "Handbook on constructing composite indicators: methodology and user guide". Following the country review and gap analysis, this report contains a set of recommendations for the entire EAP region with the aim of raising the maturity of statistics governance and closer alignment with the European DESI-related monitoring framework. Six individual country-reports have also been produced, that present the situation in these countries in detail and define recommendations for each country.

In most of the EAP countries, the main Data Collectors are national statistical agencies – Geostat in Georgia, Belstat in Belarus, Ukrstat in Ukraine, State Statistical Committee of the Republic of Azerbaijan in Azerbaijan and National Bureau of Statistics in Moldova. Only Armenia stands out in this regard, where DESI indicators are collected by a range of different public institutions and government agencies, such as Ministry of Transport, Communications and IT (MTCIT), Public Services Regulatory Commission (PSRC), Statistical Committee (SC); for example, the Central Bank (CB) of Armenia gathers data on digital payment systems. The MTCIT requests and collects information from other state agencies as well: SC, PSRC, Ministry of Finance, Ministry of Culture, Ministry of Education and Science (MES), Ministry of Health and others. The Ministry of Transport, Communication and IT also operates administrative registry of IT companies. SC collects its key information from household surveys and PSRC gathers data from mandatory enterprise reporting in the field of telecom.

In those countries that do have National Statistic Agencies, other institutions are also involved, together with the main Statistical Agency, in collection of DESI-related statistics. In Moldova such institutions include National Regulatory Agency for Electronic Communications and Information Technology of the Republic of Moldova (ANRCETI) and National e-Governance Agency; in Belarus - National Centre for Electronic Services (NCES), Ministry of Communication and Information and Operational and the Analytical Centre under the President of the Republic of Belarus; in Ukraine - Ministry of Economic Development and Trade of Ukraine (MEDT).

The list of collected DESI indicators varies greatly from country to country. In Armenia, only 9 out 82 DESI indicators are collected, followed by Ukraine with 12 collected indicators and Moldova with 15 indicators. Azerbaijan, Georgia and Belarus gather more DESI indicators –36, 41 and 58 respectively.

[1] https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=54991

Country-specific reports, containing specific roadmaps and recommendations for harmonisation in each EaP country (annexed to this report), served as the background information for developing a regional roadmap.

2. STUDY OBJECTIVE AND METHODOLOGY

The overall objective of the study is: "to contribute to more evidence-based policy-making regarding the digital economy and society in the EaP region, on the basis of more and better-quality statistics, in line with EU norms and best practices". The study also contributes to "better monitoring the regional and bilateral EaP actions financed by the EU in the area of the digital economy and society", and "provides valuable input to the new Regional Statistics programme for the EaP region.

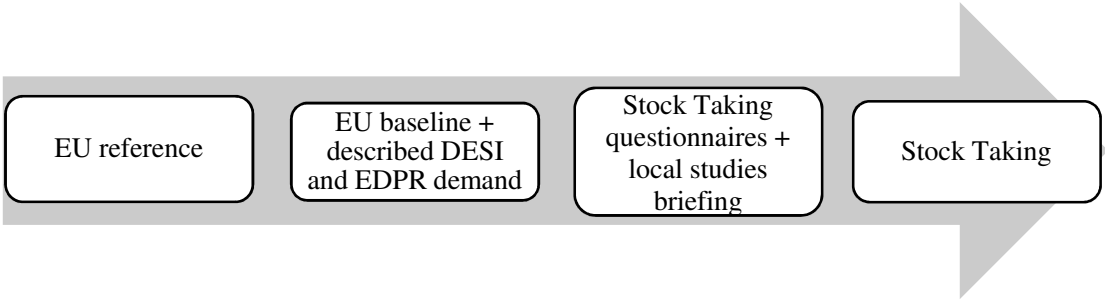
It is assumed that the study's stated objective can be achieved if:

- the study provides guidance on EaP partner country's data collection processes and reporting practices;
- in addition to DESI indicators, the core focus of the study, other indicator groups are covered as well;
- proposed recommendations are specific and possible to implement;
- detailed financial analysis of proposed activities is not required.

The study capitalizes on the EU reference Monitoring Framework for the Digital Economy and Society 2016-2021, including the digital scoreboard, the DESI and the EDPR. Preparation of the baseline is performed by analysing the EU key reference sources, together with the main actions planned under the HDM agenda, EU4Digital and the new regional Statistics Programme for the EaP region. The accomplishment of these tasks results in an articulated EU baseline and the described requirements for DESI and the EDPR data collection and reporting. Such baseline is further used for benchmarking to measure the gaps between data collection and reporting practices in the EaP partner countries compared with those in the EU.

The study's baseline has been used for developing the questionnaire which the national experts used to undertake a stock taking survey to be further discussed with the EC. National experts received a detailed briefing on how to fill in the questionnaire to ensure the use of the same methodology across the EaP countries and for comparable gap analysis. The briefing also included separate with guidelines on how to conduct interviews. The stock taking process is graphically depicted below in Figure 1.

Figure 1 Framework for the study preparation



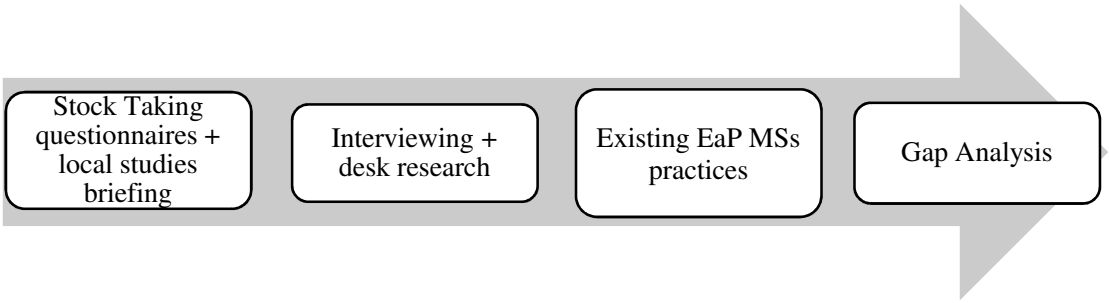
Stock Taking

The prepared questionnaires contain specific questions to be answered by (a) using a set of provided options), (b) answering open-ended questions for wider explanations, and (c) applying a

five-point Likert scale. Preparing the questionnaires was preceded by a desk research to investigate local conditions in each EaP Country.

The stock taking exercise was undertaken under the leadership of the SE to ensure quality of the collected for further reporting and gap assessment (Figure 2).

Figure 2 Framework for the stocktaking procedure



Additional questionnaires were developed with the aim to assist in measuring and assessing policies, capacities and practices existing in the Partner Countries in the field of collection, analysis and presentation of statistical data on digital economy and society. The assessment is undertaken by way of comparing such data with similar policies, capacities and practices of the European Union representing the EU baseline in view of closer harmonisation with the latter. The Digital Economy and Society Index (DESI - https://ec.europa.eu/digital-single-market/en/desi), as well as the European Digital Progress Report (EDPR - https://ec.europa.eu/digital-single-market/en/news/european-digital-progress-report-review-member-states-progress-towards-digital-priorities) were the main sources of such baseline. Since the Digital Economy and Society Index measures the progress made by the EU Member States towards a digital economy and society, it brings together a set of relevant indicators on Europe's current digital policies.

The data included in the index are mostly collected by the European Commission services (DG CNECT, Eurostat) and via the ad-hoc studies launched by the Commission services. It is composed of eight principal dimensions, each divided into a set of sub-dimensions, which are in turn composed of individual indicators. The gap assessment targeted state statistical offices, other governmental organizations, responsible for data collection for domestic purposes and also for reporting to international organizations (e.g. ITU, UNSECO, UNCTAD, UNDESA, WHO, the World Bank, EU. The Index allows the four main types of analysis: 1. General performance assessment: to obtain a general characterization of the performance of individual EaP states by observing their overall index score and the scores of the main index dimensions; 2. Zooming-in: to pinpoint the areas where EaP state performance could be improved by analysing the scores of the index's sub-dimensions and individual indicators; 3. Follow-up: to assess whether there is progress over time; 4. Comparative analysis: to cluster EaP states according to their index scores, comparing countries in similar stages of digital development so as to flag the need for improvement in relevant policy areas.

Questionnaire on Indicators

The questions are presented in Table 1 of the national reports for each EaP country and include only the publicly available information. The answer options contain information about the availability of the proposed indicators in synergy with DESI reporting domains.

Some of these indicators can be used for calculations of the Digital Economy and Society Index (DESI) and EDPR. They meet the requirements of being compatible with the corresponding DESI indicators (see Methodological Notes - **https://ec.europa.eu/digital-single-market/en/**). More specific description of the DESI methodology could be found from above-mentioned Methodological Notes. As to other indicators, some of them are under revision at the moment. However, it would be useful to have information about them or their proxies for the purposes of the study. Description of some other indicators could be found at **http://ec.europa.eu/eurostat/web/digital-economy-and-society/** or in corresponding methodological documents, related to the different aspects of the study, such as Oslo Manual – Proposed guidelines for collecting and interpreting technological innovation data (http://www.oecd.org/science/inno/2367580.pdf).

All the received answers had to be justified with evidence materials (web links, references to the statistical publications and other documents). This means that it was important to mention the sources of the data, where it was possible.

In addition to above-mentioned indicators, it was important to describe, what **other indicators** were used at the national level for monitoring of development of digital economy and ICT sector. Special attention was paid to the availability of such indicators, which are related to the description of **digital economy**:

Survey steps

1) The survey started with the **desk research** to assess the current status of data collection and to reveal, which indicators were available from open sources.
2) After the desk research, **interviews were** conducted with relevant authorities responsible for collection, analysis and presentation/reporting of statistical information.

The questions for interviewing national authorities were divided into four main groups to reveal major problems in DESI statistics. A five-point scale – ranging from 5 (the highest level) to 1 (the lowest level) – was applied to describe the level of importance of the problem, based on the weight of directly calculated DESI indicators:

- 0-19% - 1 point;
- 20-39% - 2 points;
- 40-59% - 3 points;
- 60-79% - 4 points;
- 80-100% - 5 points.

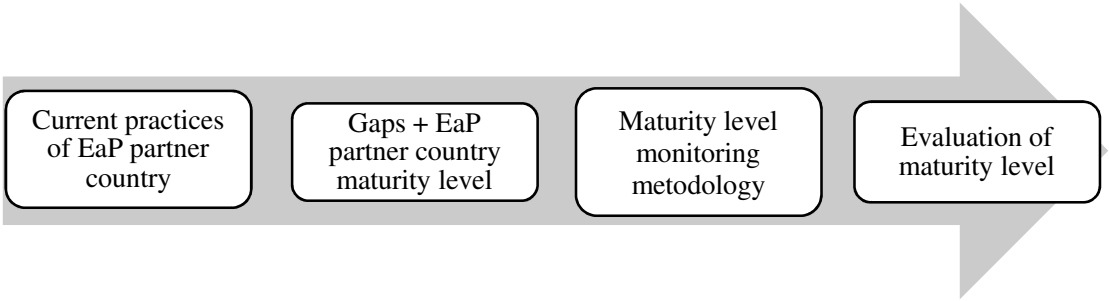
In the cases, where indicators are collected but uses different definitions, methodology, periodicity and etc., **expert judgement was used to evaluate the proximity** of gathered information as well as effort required to achieve full compliance with DESI methodologies.

3. GAP ANALYSIS

The result of the stock taking is analysed against the prepared EU baseline to measure the gap between current practices in EaP MSs data collection and reporting and the EU baseline. The obtained gap levels are used to assess the maturity level of each EaP partner country in monitoring the Digital Economy and Society. Identified gaps are explained in the report with additional information on possible causes.

The process of evaluating and monitoring the changes in the maturity level in each EaP partner country is presented in Figure 3.

Figure 3 Framework for the maturity level monitoring



3.1. COUNTRY OVERVIEW

Armenia

Taking into account the state of play regarding DESI-related statistics in Armenia and the gap analysis**Błąd! Nie można odnaleźć źródła odwołania.**, the Study Team concludes that the maturity level of Armenia in monitoring the Digital Economy and Society could be **assessed as a 2 out of 5.**

The Armenian Government has been implementing policies and projects to develop e-society since the start of the 2000s. In 2009, the government established the e-Governance Infrastructure Implementation Unit CJSC (EKENG) which has been acting as the main technical operator of e-services. The first e-Society Development Action Plan, defined for the period of 2010-2012, envisaged improvements in the legislative environment for the development of the information society, various e-services, and necessary infrastructure. In 2014 e-Governance Strategic program was adopted by the Government (https://www.e-gov.am/protocols/item/370/).

Internet-based interaction and communication in G2C, G2B and B2C domains is now widely used in Armenia. A number of sophisticated platforms between citizens, businesses and the government have been created, such as www.e-gov.am (access to a range of services and information including tax filing, procurement notices, and legislation), www.e-register.am (business registration) and others.

Information infrastructure is one of the biggest challenges of digital economy in Armenia. There is a lack of an overarching and comprehensive data policy that would institutionalize data generation, classification, processing and exchange practices in both public and private domains. Furthermore, there is no dedicated regular monitoring and evaluation framework to track the development of digital economy performance, which means that there are =some gaps in information regarding digital indicators in Armenia.

Currently the main statistics for digital economy is collected by using the forms provided by international organizations, such as the International Telecommunication Union (ITU). There are several state organizations in Armenia, which are responsible for collection of information, related to digitalization processes. The key agencies responsible for collecting data on digital economy in Armenia are the Ministry of Transport, Communications and IT (MTCIT), Public Services Regulatory Commission (PSRC) and Statistical Committee (SC). The Central Bank (CB) of Armenia is gathering data on digital payment systems. The Government Decree N 985-Ա (19.07.2012) defines the form and protocol for collection and operation of administrative registry on ICT indicators as requested by international organizations. According to the mentioned Decree MTCIT is responsible for running this registry and updating annual statistical data for each year (the reporting period is July 30 of the year following the reporting period).

The comparison of available statistics on digital economy in Armenia to the baseline of DESI, shows that the local information infrastructure is far from sophistication and is not able to provide comprehensive set of data to monitor the development of the sector. Only 7 indicators out of 82 are collected as per mentioned methodology on a systematic basis in Armenia. In addition, information on 13 indicators has been collected with one-time efforts or could be substituted by the 'proxies. In the same time, the main responsible agencies mentioned that in majority of cases the data is not difficult to collect, they just need to modify or add minor changes to the questionnaires they use for data collection.

Azerbaijan

Digital economy and information society monitoring data in Azerbaijan are produced mainly by the State Statistical Committee of the Republic of Azerbaijan (SSC). Other institutions collecting some additional data or contributing to the monitoring are listed in Annex 1. Those organizations do not submit their reports to the SSC, so some data disparity is possible.

Taking into account the state of play regarding DESI-related statistics in Azerbaijan and the analysis conducted**Błąd! Nie można odnaleźć źródła odwołania.**, the Study Team concludes that the maturity level of Azerbaijan in monitoring the Digital Economy and Society could be **assessed as a 3 out of 5.**

The best situation is with the group of indicators on Connectivity, Use of Internet and Digital Public Services. These positions are covered from 63% to 100% by available indicators. However, some data could be obtained as assessed by experts only and thus are not fully reliable. The least progress is made in collecting indicators on e-Government Supplies and Integration of Digital Economy. E-Commerce possesses 'intermediary' position with approximately one-third of indicators available (both for DESI and non-DESI indicators).

Since 2013, reports on the national system of indicators on information society development are implemented in electronic form. It has to be noted, that some additional information (indicators) that could be useful in assessment of DESI development in Azerbaijan were identified. They are mainly related to the usage of ICT by households and enterprises.

Belarus

Taking into account the state of play regarding DESI-related statistics in Belarus and the analysis conducted**Błąd! Nie można odnaleźć źródła odwołania.**, the Study Team concludes that the maturity level of Belarus in monitoring the Digital Economy and Society could be **assessed as a 4 out of 5**. While Belarus collects a considerable amount of data (73% of all DESI indicators are

reflected this way or another), the available indicators do not match DESI's in definition and disaggregation scope periodicity of collection. Most of the indicators are collected at the national level, with some of them being collected once in two years.

Every DESI core field (except Integration of digital technology) has at least 50% indicators that are covered by collected data in Belarus. The most covered field are Connectivity, Trust, Security and Privacy and e-Government Supplies where 100% of indictors are collected. The second line is represented by eCommerce with about 85% of collected indicators. In the third line are the rest of the field, Use of Internet, Human Capital, Digital Public Services and Integration of Digital Technology with 70%, 57%, 50% and 43% of the indicators collected respectively.

The data are also somewhat lacking in terms of its periodicity. While some indicators are collected annually, a big part of the indicators are collected once in two years. Also, in some cases data come from one-off surveys and it is unclear whether they will or will not be repeated in the future.

Georgia

Data on ICT use and DESI indicators are collected in Georgia by multiple government bodies and international organisations. The main government agency responsible for collecting DESI-related data is the national statistics office, Geostat. It is complemented by the GNCC, the Georgian communications regulator, which collects a wide variety of census data related to mobile networks and connectivity directly from telecommunications providers. The Data Exchange Agency (DEA) is the main government body responsible for e-Government services and is another valuable source of data. Other data are collected in Georgia by such international development organisations as USAID or GIZ.

Taking into account the state of play regarding DESI-related statistics in Georgia and gap analysis, the Study Team concludes that the maturity of Georgia's performance in monitoring the Digital Economy and Society could be assessed at the level of **3 out of 5**. This means that Georgia collects a considerable proportion of DESI data, but not all of them and there is still room for improvement in terms of data disaggregation, collection periodicity, covering the remaining indicators that are not yet available.

The analysis of DESI indicators shows that 45 out of 82 DESI indicators are collected in Georgia, which constitutes 55% of the target. 12 DESI indicators are gathered partially having some underlying data, but still need to be further developed or revised.

Every DESI core domain includes at least some indicators that are covered by existing data in Georgia. The most covered domains are Digital Public Services excluding supplying e-Government-related information (100%, 2 out of 2), Connectivity (100%, 6 out of 6) and Use of Internet (70%, 19 out of 27). The least covered are Integration of Digital Technology (29%, 4 out of 14), Human Capital (29%, 2 out of 7).

The indicators listed above have varied levels of disaggregation. In some cases, data on individuals are broken down by regions, in other cases – by urbanisation of their residence area (rural or urban). Sometimes there is a breakdown by gender and age groups, and in other cases – by certain specific categories inherent to the indicator, such as the connection type or the type of communication technology. However, a vast majority of enterprise-level data and some individual-level indicators are not disaggregated. Overall, the disaggregation quality of the available data can be rated as medium.

The data that are being gathered somewhat lack the consistency in terms of collection periods. While some indicators are collected annually, others seem to come from one-off surveys (and it is unclear whether or not they would be repeated in future). Also, for many other indicators, no information is provided on the periodicity or the date of the most recent underlying data.

Moldova

According to World Bank estimates, Statistics Development Index reached a score of 94.4 on the 0-100 scale which far exceeds the average for European and Central Asian region (77.7)[2].Moldova has prepared a strategic framework for the development of national statistics. The National Bureau of Statistics (NBS) operates under the Law on Official Statistics[3] and is an authorized government agency responsible for the development of statistics in the country in cooperation with other public institutions involved in producing official statistical information. The process of the country's political alignment with European and international principles and values has helped advance the development of official statistics and connected the NBS directly to the EUROSTAT and UNSTAT.

Taking into account the current DESI related statistics in Moldova and the results of the gap analysis, the Study Team concludes that the maturity level of Moldova in monitoring the Digital Economy and Society could be **assessed on 2 from 5 points scale**. Moldova started the process of DESI monitoring about eight years ago, when the national e-Government Centre was created by focusing on reporting on the development of electronic services; however, data collection was not the Centre's goal. In 2012, the *Agreement between central public administration institutions on the distribution of the responsibilities for collecting, producing and disseminating the indicators for monitoring the edification of the information society in the Republic of Moldova* was signed. Yet the Agreement was not implemented and most of the indicators, including seven similar or very close to DESI indicators were not collected at all.

At present, only 23 from 82 DESI indicator are collected and none of them are collected as direct and indirect DESI indicators. Digital Public Services field is covered fully, however through on time effort in 2016 (a second survey is planned in 2019). The only field which is relatively well covered is **Connectivity** and **Use of Internet,** where 4 out 6 and respectively 11 out 27 of indicators are collected. The most problematic fields are **Trust, Security and Privacy** and **Human Capital** with none indicators collected.

The field of **Trust, Security and Privacy** and **Human Capital** is not covered by the Moldovan Statistics at all. It is important to mention that in the Ministry of Internal Affair exist a specialized department for Cybercrime, which is the Centre for Combating Cybercrime within the National Investigation Inspectorate. The Centre actively participates in actions dedicated to promoting online security and information security, increasing awareness of online threats and presenting solutions to solve the problems identified in the online space. The information about the statistics on cybercrimes is presented on the web page of the General Police Inspectorate. (http://politia.md/ro/advanced-page-type/rapoarte-si-evaluari).

The Information Technology and Cyber Security Service (public institution) was reorganised in 2018, which has the goal to help other public institutions in cybersecurity. Within this Service activates the Centre for Cyber Security (https://stisc.gov.md/servicii/servicii-cert), which was created to assist beneficiaries in the use of information and telecommunication systems of public

[2] http://datatopics.worldbank.org/statisticalcapacity/CountryProfile.aspx

[3] Law on official statistics no. 93 of 26.05.2017 http://lex.justice.md/viewdoc.php?action=view&view=doc&id=370784&lang=1

administration authorities in implementing proactive and reactive measures to reduce the risk of IT security incidents and to assist in responding to incidents. The Centre also examines incidents occurring in Moldovan networks and reported by citizens and institutions in the Republic of Moldova as well as abroad.

Existing questionnaires of the National Bureau of Statistics allow to collect relevant DESI indicators for **Human Capital** field, but no methodology exists how to do it.

The data, which are published by National Bureau of Statistics have medium level of disaggregation; for example, data on individuals are disaggregated in some cases by regions, in other instances -- by place of living (rural/urban), gender and age groups. However, most of the data are broken-down only by year.

Ukraine

The detailed analysis of DESI indicators shows that about 50% of DESI indicators are impossible to calculate without changes in the current national statistical system. The most problematic domains of indicators relate to e-government, e-health, trust, security and privacy lacking the defined and established methodologies for data collection. Even though the cybersecurity department has been established in the Ministry of Internal Affairs of Ukraine, it doesn't publish any statistics about cybercrime and security incidents / breaches. In addition, the National bank of Ukraine announced in 2017 about the creation of a special centre on cybersecurity. But no information about its activity is available at the time of this study.

Taking into account the state of play regarding DESI-related statistics in Ukraine and the analysis conducted**Błąd! Nie można odnaleźć źródła odwołania.**, the Study Team concludes that the maturity level of Ukraine in monitoring the Digital Economy and Society could be **assessed as a 3 out of 5.**

Overall, only 13 out of 82 DESI indicators are published officially. Their methodologies are to some extent relevant to the EU practice (however, with some differences, as in the case of the proportion of individuals, who use the Internet regardless of their age; moreover, the age group definition differs from the EU one, as mentioned above). 11 out of these 13 indicators are based on data about Internet utilization by households. The remaining two indicators relate to the use of cloud computing services by enterprises and big data utilization. 9 out of 82 indicators could be easily calculated as there are absolute numbers. 14 out of 82 indicators require direct access to primary data so they could be calculated only by Ukrstat who owns the data.

The data published by the Ukrstat are well disaggregated. The data on households (individuals) are broken down by regions, place of living (urban/rural, cities); gender, age (separate data on other age groups, individuals aged 15 years or less, aged 75 or more); income level, household size, etc. These data should be readjusted in line with the EU format (according to age 16-74).

The remaining indicators can be calculated by Ukrstat, as it collects relevant data from enterprises. The problem is that the Ukrstat provides data on corresponding indicators in absolute values only, which requires additional calculations for making comparisons between the EU and Ukraine.

In conclusion, Ukraine has started the process of DESI monitoring more than 5 years ago, when the national system of information society indicators was initiated (the agency on informatization existed in Ukraine since the mid-90s). With the establishment of the State Agency on e-government several years ago some functions related to information society development were abolished. Currently, there is no neither special agency, nor permanent working group on digital

economy development. However, there is the national Concept and the Government's Action Plan for it. There is also a task team led by MEDT together with Ukrstat and other bodies to develop a new system of DESI indicators (it was announced it should be based on the EU's DESI system). Yet we observe the lack of inter-agency coordination, with each agency having its own plan, e.g. Ukrstat is harmonizing with the EU standards without collaboration with other agencies. Ukrstat is the key player in data collection in Ukraine. And now it collects more DESI related data than it publishes officially. However, the speed of adjusting questionnaires for statistical surveys is not sufficient for achieving a higher level of maturity.

3.2. Key results of gap analysis

Taking into account the state of play regarding DESI-related statistics in the EAP countries and the analysis of the information contained in Table A, the Study Team concludes that the maturity of EAP region's performance in monitoring the Digital Economy and Society could be assessed at the level of **3 out of 5**. This means that EAP countries are in the middle of the way to full coverage of the DESI related statistics. Some countries have achieved better results and, in some domains, collects even 100% of the indicators. At the same time, other countries don't collect any DESI related indicator to one or more DESI related fields.

Table A Shares of information on DESI Indicators[4], which can be collected in EaP country*

DESI CORE AREAS	AM	AZ	BY	GE	MD	UA	TOTAL
Connectivity	33%	83%	100%	100%	67%	83%	**78%**
Integration of Digital Technology	7%	7%	43%	29%	21%	50%	**26%**
eCommerce	15%	38%	85%	46%	15%	38%	**40%**
Trust, Security and Privacy	0%	43%	100%	43%	0%	14%	**33%**
Use of Internet	41%	63%	70%	70%	41%	44%	**55%**
Human Capital	43%	57%	57%	29%	0%	57%	**40%**
Digital Public Services	0%	100%	50%	100%	100%	50%	**67%**
e-Government Supplies	17%	17%	100%	50%	17%	17%	**33%**
Total shares of indicators covered out of 82, in %	**24%**	**46%**	**73%**	**55%**	**28%**	**44%**	**45%**
Maturity score	**2**	**3**	**4**	**3**	**2**	**3**	**3**

*information on x% of the number of indicators in the core area is available

These data demonstrate that different countries have different levels of data coverage. Belarus is a leader of this group (however, methodological changes to current practices will be necessary), while Armenia and Moldova are lagging behind. Georgia, Azerbaijan and Ukraine are somewhere in between. It is also worth to mention a relatively high level of the coverage in all countries by the indicators, related to 'Connectivity' (except Armenia) where level of coverage was not less than

[4] Including approximated indicators

67% The second field with high coverage rate is ‘Use of Internet’ with at least 37% in Armenia while it reaches 70% in Georgia and Belarus.

Other important similarity represents the used methodology for data collection and the desegregation. All EAP countries use the annual surveys and the data on households (individuals) are broken down by regions, place of living (urban/rural, cities); gender, age, income level, household size, etc.

On the other hand, DESI related field with the lowest rate of collected data is Trust, Security and Privacy. Armenia and Moldova do not collect at all indicators related to this filed, other three collect less than 50% of the indicators (Azerbaijan, Ukraine and Georgia) and only Belarus collect all indictors related to this field.

4. CAPACITY NEEDS ANALYSIS

In order to understand the problems of data collection related to DESI indicators, a series of interviews were conducted with the representatives of authorities responsible for the collection of that data

The capacities questionnaire consisted of four question groups:

- Group 1: Data collection and analysis
- Group 2: Data quality
- Group 3: Resources
- Group 4: Reporting

4.1. COUNTRY OVERVIEW

Armenia

Given the current state-of-play in Armenia, key issues were identified during the interviews.

Lack of coordination and underdeveloped institutional setup for digitalization. For a long period of time there has been no dedicated institution in the Government of Armenia charged with digital transformation of Armenia's economy, as well as with monitoring and evaluation of the progress made in such transformation. Practice shows that each of the line ministries collects information according to their own needs. This leads to an uncoordinated collection of data, low level of quality of collected information, duplication of effort, approaching disparate sources for requesting the same information, and to inadequate cooperation in terms of data exchange among various state agencies. In August 2017, the Government of Armenia created a central coordination institution for the digital economy – Digital Armenia Foundation. The foundation was supposed to be responsible for designing and administering statistical monitoring system for the digital economy. However, the foundation was closed down in 2018, and its digitalization-related functions have recently been transferred to the Ministry of Transport, Communication and IT. It is expected that the Ministry will start to design strategies on creating comprehensive framework of data collection for digital economy.

Lack of policies and strategic prioritization in the area. The Government of Armenia has been implementing various initiatives and projects in support of developing eSociety in Armenia since the 2000s. As of now, the Government has announced its intention to enhance ICT sector and intensify digitalization processes in the country. Currently the Digital Transformation Agenda of Armenia is under discussion.

The main type of support expected from external resources is two-fold: funding for organizing surveys and providing technical assistance to designing strategies, concepts and methodological guides for collecting statistics in the field of DESI.

Low level of demand for data and intelligence in private sector and academia. The importance of data and data-driven decision making is largely underestimated not only in the government but also in the private sector. In addition, academia's demand for data as inputs for data-driven research is scarce. This leads to a low level of data production and collection in the private sector. The government should take a lead in the sector by designing and implementing

strong data policies, particularly promoting the data exchange (both on G2B and G2G levels) and open data practices, including measuring the performance of digital economy.

Underutilization of administrative data. Despite existing possibilities for access to statistical information, the level of usage of data from administrative state registries is not sufficient in Armenia's statistical system (in fact, these registries are statistical databases on corresponding organizations, individuals and their activities). Yet administrative data are the key sources of information as well. The state collects these data as the result of public service provision. That includes, but is not limited to databases on IDs, births, marriages, police, etc. This could significantly improve the section of e-government services in DESI questionnaire. It could also cover part of eCommerce section (e.g. from the data of Tax and Revenues Committee). Such an approach has two main reasons: 1) there is no consistent framework in place defining the scope, classification, frequency and other methodological aspects of data collection on digital economy, and 2) there is no complex data exchange among existing administrative databases. However, there is also a need and intention to digitalize the platforms and collection of statistical data as well. Once the procedure of data collection (for example, based on enterprise surveys) is automatized through digital platforms, the quality and access to statistical information will improve significantly. The Statistical Committee has also developed a Concept Note on how to digitalize the data collection from enterprises.

Azerbaijan

The plan of international cooperation under the State Program for the Development of Official Statistics in Azerbaijan in 2018-2025 includes continued cooperation with the Eurostat, specialized agencies of the UN and other international organizations in the field of statistics. With this purpose, it is necessary to adapt relevant statistical areas to the European and world standards (DESI indicators), participate in various technical aid programs, international events, and ensure timely and qualitative response to incoming questionnaires.

Based on the interviews conducted, there is a number of problems national authorities face in producing statistical data. One of them is low level of responses, which, in turn, leads to low level of reliability of some reports. Another problem lies in the duplication of collecting similar data and the difficulty of comparing data of surveys conducted by different organisations. Azerbaijan's marketing company SIAR Research and Consulting Group (AzMarketing Society), for example, conducts annual survey for Network readiness index data according to the agreement with WEF for the Global Information Technology Report. Some of these data overlap with those collected by the State Statistical Committee, with negligible difference in meanings of some indicators.

All surveys are conducted by departments and regional divisions of the State Statistical Committee. Additional resources in the amount of 30 000 AZN (15 000 EUR) is allocated for surveys of households – 0.5% of the total households. Relatively low salary of the people conducting surveys can negatively affect the quality of data (it is difficult to involve fully qualified specialists).

With the purpose of improving the quality of its reports, the SSC maintains cooperation with Eurostat and other relevant organizations within the framework of various mentoring programs, trainings, etc. There is a need for further support from Eurostat and EC in the form of consultations on new indicators, in particular DESI.

Belarus

The representatives of the relevant public authorities stated that the **Absence of the corresponding unit** for collection of the relevant data has a low impact on the general DESI indicators collection process. Moreover, the interviewers mentioned that usually, the authorities used indirect methods and analysis of open information resources to obtain information on some specific indicators (for example for the field of Trust, Security and Privacy).

Related to quality control, the biggest challenges regarding data control represent the difference in the national definition of specific objects under survey and different data acquisition periods (once in two years).

The respondents also mentioned that all the methods presented in the questionnaire are used for verification of the collected data. However, one of them - namely statistical evaluation -- is used much more rarely than other three, and usually represent an exception rather than a rule.

Respondents did not express interest in receiving assistance from Eurostat or the European Commission in data collection (the question about an interest in financial assistance was not answered). The only field in which respondents would be interested in is assistance in the form of consultations. Related to other types of assistance, including financial, the respondents, mostly, have overlooked the question, avoiding any response.

Related to the Reporting part, the only one response was given to mention that the field of Digital Public Services needs increasing the number of the indicators.

In conclusion, Belarus data collection authorities possess sufficient capacity to collect the required data on ICT and digital society but could still benefit from assistance from the respective European institutions.

Georgia

The interviewed representatives of relevant public authorities do not believe that there are any major problems with the ability to conduct data collection and analysis; yet the insufficient availability of funding was reported as being a likely problem to a certain extent. However, the representative of Geostat, the only surveyed institution directly responsible for collecting data, did not identify this as a problem, which might imply that lack of funds was invoked as a general cliché in Georgian society and not due to direct factual exposure.

Similarly, no major problems were identified with data quality. The respondent who indicated that “historically not too many indicators measured” (in the “other reasons” category in the data collection group) did not find “short time series” as a problem. This, together with the high levels of non-response, may point to the fact that some of the questions on data quality and verification methods were too technical for the government representatives not directly concerned with statistics.

All respondents reacted positively to the idea of receiving assistance in their data collection efforts from Eurostat and/or the European Commission. Training of personnel, consultations, and preparing the questionnaires were unanimously agreed upon as relevant areas for support. Representatives of policymaking institutions would like to see more areas for possible support than those suggested by the data collecting authority (Geostat). Organisation of surveys was the only area on which there was a consensus that no assistance is needed.

When asked how much it would cost to collect the remaining DESI indicators not yet available in Georgia, the respondents indicated the amounts **between 30,000 and 40,000 EUR** (90,000 to 120,000 GEL).

No answers were provided to questions of Group 4, as it relates to a number of additional ICT indicators that are not present in the DESI framework and which there are not collected in the Georgian case.

In conclusion, whereas the Georgian data collection authorities possess sufficient capacity to collect the required data on ICT and digital society, they welcome assistance from the respective European institutions.

Moldova

According to the e-Government Agency, there is no a well-defined and framed culture of research, data collection and data processing, evidence-based policy making in Moldova's public administration sector. Therefore, in most cases, public authorities are not provided with the relevant budgetary and human resources, as well as technologies and methodologies, to measure and monitor specific indicators on a regular basis.

Another important element is the need to update the indicators so that they correspond both to the developments and main development reforms agendas within the country, as well as to the internationally recognized innovative approaches and standards in the field.

Budget constraints do not allow public sector organizations to invest in data collection and analysis. Until now, only the e-Government Agency has invested in self-evaluation and internal evaluation frameworks public perception indicators and targets.

Most public authorities do not understand the importance in investing resources into researching public perception of their services, products, policies.

On Data Quality, the interviewees mentioned that there is an insufficient attention in the public sector to the importance of data-based innovation, evidence-based policy making and decisions-making process. Another important obstacle in ensuring adequate data quality, the interviewers mentioned the lack of openness to use alternative data sources and innovative data collection, processing, use/reuse, dissemination methods, as well as the difficulty the public authorities experience in adjusting to the data needs of other institutions and actors and to reform the ways they collect data.

When asked about the type of support from the EU and Eurostat, the interviewees unanimously revealed their interest to benefit from the EU on personnel training, questionnaire preparation, organization of surveys, data analysis and consulting. But it was difficult for them to provide the cost of resources they need. Only ANRCETI specified the full amount of needed sources (some 1.5 million MDL, or about 75 000 Euros).

On the issue of Reporting, the answers to the questionnaire show that most of the Indicator Fields are considered either important or very important. The field of Integration of Digital Technology, eCommerce, Trust, Security and Privacy, Use of Internet and the e-Government supplies are considered as most important, being marked with 5 point on a 5-point scale. The lowest points (3) got the Connectivity field (one with the highest level of collected indicators).

Ukraine

In the area of capacity analysis, Ukrstat faces the problem of absence of the corresponding instruments for data collection (questionnaires, methodological materials for sampling, etc.) and lacks finance for organizing surveys. The lack of qualified personal is assessed as a moderate problem. Low salaries at Ukrstat impede attracting and keeping the highly qualified personnel.

Based on interviews with experts, the main problems the national authorities face in the process of data collection, analysis, presentation/reporting is the absence of corresponding statistical unit,[5] lack of finances for organization of survey, shortages of qualified personnel, as well as in the absence of corresponding instruments for data collection (questionnaires, methodological materials for sampling, etc.). Low level of interest from the government's leadership further compounds these problems.

The data quality depends on whether the statistical questionnaires are understood by respondents in the same way. It's been revealed that often there is discrepancy in understanding among them how to fill in questionnaires which decreases the quality of collected data. Differences in definitions of the surveyed objects contribute negatively to data quality as well. Low level of response also affects the quality but to a lesser extent. To address the data quality issue, Ukrstat uses the Statistical evaluation and indirect methods of evaluation procedures to verify collected data.

Answers on the type of support from the EU and Eurostat were unanimously positive. Ukrstat is interested to benefit from the EU side on personnel training, questionnaire preparation, organization of surveys, data analysis and consulting. However, it was difficult for them to estimate costs of the resources needed.

Ukrstat did not answer questions in Group 4 "reporting" which might be interpreted as an indication of low interest in broader issues of DESI measurement due to its focus only on statistical measurement and data collection (and harmonization of statistics with the EU practice), but not on the processes behind it.

Given the provided answers obtained through the questionnaire on capacity and information, it can be concluded that:

- Ukrstat is open and ready to cooperate with the EU and Eurostat on the DESI related issues;
- Other agencies, in particular the Ministry of Economic Development and Trade, will likely to benefit from the EU support, but their needs should be identified via direct contacts
- The list of DESI indicators needs to be approved by the Government. It should be developed by the Ministry of Economic Development and Trade in cooperation with Ukrstat and other agencies. Only after that Ukrstat will be entitled to change its statistical questionnaires;
- The EU assistance could contain many types of activities, which Ukrstat stated as their needs: instruments for data collection, personnel training, data analysis etc.

[5] There is no single unit responsible for DESI statistics in Ukraine. Even Ukrstat has no one division responsible of digital economy.

4.2. KEY RESULTS OF CAPACITY NEEDS ANALYSIS

In order to perform capacity needs analysis up to six interviews per country were conducted with relevant institutions or experts.

Data Collection and Analysis

As a result, it was found that the most common problem related to data collection and analysis for the region is the Absence of a dedicated statistical unit. The second important problem represent the lack of financing for organization of the surveys (Moldova and Georgia) and for salaries of public authorities' staff (Moldova and Azerbaijan). The last one is a cause of a lack of qualified personnel and is relevant for Ukraine and Moldova.

Other specific problems for some countries are Underutilization of administrative data and Absence of special statistical agency and Duplication of collecting similar data (Azerbaijan).

Below are presented the aggregated results from capacity needs analysis.

Data Quality

Related to data quality no major problems were identified. The most common problem represents the low level of response from respondents (Ukraine and Azerbaijan). Other specific problems are slow adaption of new data collection methods (Moldova) and Differences in national definitions of specific objects under survey Belarus)

Data verification methods

It's important to mention, that only representatives of four countries (Belarus, Ukraine, Moldova, Georgia) offer details related to verifications methods which are used. Therefore, three of them (Moldova, Georgia and Belarus) used all indicated methods for data validation, while Ukraine used only Indirect methods of evaluation.

Resources needed

In order to increase capacity on collecting DESI indicators all respondents reacted positively to the idea of receiving assistance in their data collection efforts from Eurostat and/or the European Commission. Training of personnel, consultations, and preparing the questionnaires were unanimously agreed upon as relevant areas for support. Representatives of policymaking institutions would like to see more areas for possible support than those suggested by the data collecting authority.

Specific type of support was mentioned by Armenia and Georgia, which would be interested in Technical assistance to designing strategies, concepts and methodological guides and respectively help in Short term statistics development and minimizing missing values in the business registry.

5. ROADMAPS AND RECOMMENDATIONS

Based on the results of gap analysis, a road map on how to bring EaP partner country's data collection and reporting practices closer to EU standards has been developed. The countries' road maps contain detailed recommendations based on valuation of potential investment needed, expert opinion and good practices of other EU members. This includes the necessary actions/ reforms in the field of legislation, services and ICT or other infrastructure, identification of actors involved and an estimation of the corresponding costs. As part of the roadmaps, the study proposes concrete objectives and indicators/targets for monitoring maturity level progress nationally, according to the methodology defined in the Gap analysis. The proposed roadmaps are coherent with existing international agreements involving the partners.

To complement the regional recommendations, national roadmaps aiming to ensure coherence among the efforts at national level, as well factual impact in each EaP partner country are prepared.

General Note. The Eastern Partnership (EaP) countries have both common and distinctively different problems in terms of harmonizing their national systems of monitoring the progress in building digital markets. Despite sharing common trends, such differences reflect upon the different ways of digitalizing their economies and societies, with the Association Agreement countries demonstrating a closer level of cooperation with respective EU institutions, Eurostat in the first place. Overall, the level of data collection on digitalization remains relatively low, especially in Ukraine and Azerbaijan. This means that these countries would benefit form a more targeted support in data collection and analysis. The support efforts could be coordinated by EC. The best of providing such support is to assist these (and other countries) in conducting special DESI – type surveys. These surveys could be funded by both the EaP countries themselves (in case of availability of relevant funding) and the EU. Georgian experts have estimated possible costs of such support which amounts to 30,000 - 40,000 EUR for this country. For the countries of comparable size, the costs could be similar; however, they will likely to be higher for larger countries. However, some of them, notably Ukraine and Azerbaijan noted that they would not need extra financing for collecting on DESI indicators.

Recommendation 1. Given the results of gap and capacity needs analysis. A special program on the collection of statistical data on digitalization for the EaP countries with methodological and financial support from the European Commission should be initiated. Regular EU-type surveys have to be the key source of monitoring digital markets in line with the DESI methodology. It is proposed that such assistance should also comprise, in addition to helping solve methodological issues, support in resolving technical problems, for example, correct sampling, preparation of questionnaires, work with missing data and so on. It is critical that the data have to be collected on the same methodological basis. Definitions and scope of indicators have to be the same, as in the EU countries. Almost all countries mentioned a need for special trainings and advice for both statisticians who collect data and those who supply them to the state statistical bodies or other state agencies. It's been found out that the data quality depends on whether or not the questionnaires prepared by statistical and other authorities understanding in a similar way, as an often-observed misinterpretation of what is asked by the questionnaires constitutes a significant problem. Differences in national definitions of specific objects under survey are also among the main causes of the insufficient data quality. Lower levels of response or wrong sampling could also create some problems.

Recommendation 2. Organize special trainings for both statisticians and state officials on adaption and application of DESI methodology nationally. Such training could include topics like:

- General introduction to DESI and its purpose;
- In-depth look at the current methodology, definitions;
- Methodologies seen as best practices in collection;
- Creating and using tools (e.g. questionnaires) for data collection.

However, the exact training scope and material should be confirmed with partner countries. The institution responsible – Eurostat. Belarus, Ukraine, Moldova, Armenia and Georgia mentioned the need in advisory and consultation services too. These consultation services have to compliment training.

Recommendation 3. EC should encourage countries to conduct a coordinated policy of all state organizations, involved in data collection and processing. Since all the EaP countries have different bodies responsible for collection data on digitalization, it is proposed to create specific units within relevant agency (ministry), responsible for collection and processing of DESI-related information. That might be especially beneficial for the Association Agreement (AA) countries and the non-AA countries aiming at closer harmonization with the EU.

Recommendation 4. Given that most of EaP countries have numerous organisations involved, EaP countries should establish committees for inter-agency coordination. Such bodies would take a responsibility for inter-agency coordination, which is usually a complex issue for all the EaP countries as far as data collection and analysis is concerned. This body would be supported by a special working group on statistics on monitoring the process of DESI implementation to co-ordinate activities of different state agencies, professional associations and large companies, involved into digitalization.

Recommendation 5. Legal acts related to the statistics in the sphere digitalization to maximize the scope, breadth and quality of data collection to meet international standards should be harmonized on EaP country level. This problem could not be reduced to the indicators of digital economy only. Basic statistics requires improvement, as in some cases, EaP countries declare their intention to follow international recommendations in statistics but they still use 'national' definitions of some indicators (this, for instance, applies to statistics of employment in full-time equivalent). Work on improvement of data quality should be based on corresponding Methodological Notes - **https://ec.europa.eu/digital-single-market/en/**), information on DESI in other countries (**https://ec.europa.eu/digital-single-market/en/news/how-digital-europe-compared-other-major-world-economies**) and other official sources, such as description of some other indicators of digitalisation and ICT (**http://ec.europa.eu/eurostat/web/digital-economy-and-society/)** or indicators for collecting and interpreting technological innovation data (**http://www.oecd.org/science/inno/2367580.pdf**).

ANNEX 1. DESCRIPTION OF BASELINE

1. EU policies for data gathering and reporting

1.1. Main policy makers

European statistics policies are developed by the European Parliament and the Council. They determine the legal basis for the preparation of the European statistical programme, providing the framework for the development, production and dissemination of European statistics, the main fields and the objectives of the actions.

The European Statistical System is the partnership between the Community statistical authority, which is the Commission (Eurostat), and the national statistical institutes and other national authorities responsible in each Member State for the development, production and dissemination of European statistics. This Partnership also includes the EEA and EFTA countries. The ESS functions as a network in which Eurostat's role is to lead the way in the harmonization of statistics in close cooperation with the national statistical authorities. ESS work concentrates mainly on EU policy areas - but, with the extension of EU policies, harmonization has been extended to nearly all statistical fields.

The ESS also coordinates its work with candidate countries and at European level with other Commission services, agencies and the ECB and international organisations such as OECD, the UN, the International Monetary Fund and the World Bank.

European Statistical System Committee was established by the European Parliament and the Council in 2009 to "provide professional guidance to the ESS for developing, producing and disseminating European statistics". The Commission shall consult the ESS Committee in regard to:

- The measures which the Commission intends to take for the development, production and dissemination of European statistics, their justification on a cost-effectiveness basis, the means and timetables for achieving them, the reporting burden on survey respondents;
- proposed developments and priorities in the European Statistical Programme;
- the annual work programme for the following year;
- initiatives to bring into practice the reprioritization and reduction of the response burden;
- issues concerning statistical confidentiality;
- the further development (revision or update) of the Code of Practice;
- any other question, in particular issues of methodology, arising from the establishment or implementation of statistical programmes.

The ESSC is chaired by the Commission (Eurostat) and composed of the representatives of Member States' National Statistical Institutes. EEA and EFTA countries' National Statistical Institutes participate as observers. Observers from ECB, OECD, etc. may also participate in the meetings of the ESSC.

Besides the support it gives to EU policy-making, Eurostat plays an active role in the statistical co-operation between international agencies and organisations. Eurostat represents the European Commission in the United Nations Statistical Commission, in bilateral relationships with international financial institutions (e.g. IMF, World Bank and regional development banks) and in the OECD Statistics Committee. All these international statistical agencies co-operate to set up

international standards for statistics, to improve the comparability of statistical information, to improve the coordination of international statistics-related activities, and to financially or technically support national statistical systems.

The Partnership Group is a group of Directors General of the National Statistical Institutes of the ESS whose mission is to further the development of the ESS at the highest level, notably through ensuring the effective functioning of the European Statistical System Committee. Its tasks are to:

- Identify and propose strategic issues for discussion by the ESSC;
- Assist in co-ordinating the co-operation between National Statistical Systems and Eurostat on strategic issues in order to participate in the formulation of the issues before discussion in the ESSC;
- Discuss contentious issues in order either to make proposals to the ESSC with the aim of achieving consensus or to refer them to other bodies (e.g. Sector Groups) for further work;
- Channel ideas from ESSC members on the state of co-operation and how it could be improved;
- Comment on agendas for future ESSC meetings and discuss the substance of upcoming ESSC agenda items;
- Monitor the functioning of the ESSC and its subsidiary bodies;
- Work in an inclusive way, keeping all Heads of NSIs informed of discussion and actions through information exchange via the Network Group and ensuring that non-members views can be taken into account.

The aim of the European Statistical Governance Advisory Board is to provide an independent overview of the European Statistical System as regards the implementation of the European Statistics Code of Practice. The ESGAB advises the Commission (Eurostat) on appropriate measures to facilitate the implementation of the Code of Practice; on how to communicate the Code of Practice to users and data providers; and on the updating of the Code of Practice. The ESGAB may also provide advice regarding questions related to user-confidence in European statistics.

1.2. Initiatives taken by the European Union

1.2.1. Vision 2020

The Vision 2020 was founded to modernise the production of European statistics and to ensure that the ESS remains competitive in the future.

In 2014 it was agreed that the ESS Vision 2020 was the guiding frame for ESS development up to 2020. Vision 2020 outlines five priority areas that need to be tackled Europe-wide: identifying user needs and cooperation with stakeholders, new data sources, quality, efficient and robust statistical processes, and dissemination and communication. Eurostat and the ESS Member States are now implementing these key areas.

Medium to long-term objective of Vision 2020 is to make data available on-line much quicker and to make processes used to analyse the data more transparent, user friendly and interchangeable. With better dissemination tools, it is also hoped to increase the public's statistical literacy so evidence-based policy making will be evident but also verifiable.

1.2.2. G20 Data Gaps

The G20 Data Gaps initiative is a set of 20 recommendations on the enhancement of economics and financial statistics. The programme was launched in order to improve the availability and comparability of economics and financial data, as the turmoil that hit the markets - when the financial crisis broke out in 2007-2008 - highlighted the need of broader datasets for policy makers and supervisors to better assess the evolution of the economy, as well as the intervention required.

In April 2009, the G20 Finance Ministers and Central Bank Governors called on the International Monetary fund (IMF) and the Financial Stability Board (FSB) to identify major financial and economic information gaps that needed to be filled. As a result, a few months later, in September, the IMF and the FSB presented the report that would launch the Data Gaps Initiative (DGI), along with the set of recommendations to be implemented in the years to come.

In October 2009, the IMF and FSB presented The Financial Crisis and Information Gaps report to the G20 Finance Ministers and central bank Governors. The Report, and the detailed action plan that followed, identified all the issues that need to be addressed and divided it into 20 recommendations, that have been organised in four categories and which are currently being implemented.

One of G20 Data Gaps leading initiatives is the Principal Global Indicators website, which collects and disseminates comparable data for the G20 economies.

1.2.3. Microdata linking project

The microdata linking project on international sourcing was set up by Eurostat at the end of 2012 and carried out in 2013 by the national statistical offices in nine EU Member States. The two main objectives of the project were:

- to test the centrally developed methodology for linking datasets and producing standardised outputs across a number of participating countries,
- to produce new information on enterprises that responded to the 2009–11 international sourcing survey, carried out in 15 countries including all those taking part in the microdata linking project.

The first phase involved the construction of the linked microdata files. The project coordinators produced standardised guidelines explaining in detail how the linked datasets in each country were to be structured and provided code to ensure that identical tables were made in all countries. Each country recorded information from all the data sources in one database. The microdata files were stored locally at the national statistical offices throughout the project and were not shared with third parties.

In the second phase of the project, the linked files were tested for consistency. Although each dataset being used in the project had already been carefully edited, it was necessary to carry out further checks to ensure, for example, that enterprises were represented by the same statistical units across different datasets and over time, as the reporting units used for specific enterprises could have differed across the data sources mentioned above. The tests used during this phase of the project were devised by the project coordinators and implemented locally by the national statistical offices.

In the third phase of the project standardised statistical output was created in each country, consisting of a descriptive analysis, longitudinal analysis and regression analysis.

New innovative approach was developed for combining existing statistical information by linking the data on the microdata level without increasing the burden on enterprises. Microdata linking provides an opportunity to discover new information and to develop new statistics and indicators both by using existing data sets and by combining these with new data collections.

1.2.4 GEOSTAT

The GEOSTAT initiative was taken jointly by Eurostat and the National Statistical Institutes to establish a data and production infrastructure for geospatial statistics.

The idea was to incorporate the production of geospatial statistics into the various phases of the Generic Statistical Business Process Model, which provided the framework for the production of official statistics. The European Spatial Data Infrastructure was another key element in geo-enabling statistical production.

GEOSTAT's main goal was to support NSIs in setting up their data, methods, and production systems to achieve a fully geocoded 2021 census. All census output should be aggregated from geocoded point-based information, providing sufficient flexibility to publish statistics for any type of territorial classification, including grids.

GEOSTAT 2 is the follow-up project, which seeks to create a standardised point-based geospatial reference framework for statistics. The framework was based on geocoded address, building and dwelling registers and would enable many of the data sources used for official statistics, including sample frames, to be geocoded. The project started in 2014 and continued until the spring of 2016.

2. Relevant background

2.1. Harmonisation of Digital Markets (HDM) in the EaP

INFOPARK together with Lithuanian ICT Association INFOBALT proposed “Harmonizing Digital Markets of the EU and Eastern Partnership Neighbours” as the new strategic initiative for the next period of EaP programme development in 2014-2020. This project area was created for harmonization and convergence of EU-EaP digital markets by means of multilateral projects to be implemented by partners from the countries involved.

According to the declaration, participants of the program will adopt following EU practices:

1. Electronic services

eGovernment

The participants are developing eGovernment infrastructure and services to guarantee transparent and effective public administration, while interoperable digital solutions prevent the emergence of new obstacles to the development of the Digital Economy. Program actions are aimed at triggering a wider deployment of eGovernment services in the partner countries and further simplification of transactions between citizens and businesses on the one hand, and public authorities on the other.

Open data

The participants are providing wider access and reuse of public sector information using the general principles of the Charter on Open Data as guidance. They also agreed to consider other

recent developments such as the revision of the EU Directive on the re-use of PSI and the adoption of EC guidelines on recommended standard licences, datasets and charging for the re-use of PSI.

eHealth

The participants are developing recommendations for a possible long-term eHealth strategy in the EaP paying particular attention to telemedicine, prevention, home care, remote illness monitoring, electronic patient files (electronic medical records) and m-Health (medical and public health practice support by mobile devices such as smart phones, patient monitoring devices, tablets and other wireless devices). The participants will involve all key stakeholders in establishing appropriate rules, in particular regarding accessibility and use of personal data.

eCustoms

The participants start the procedure of replacement of paper-based customs procedures by electronic ones; introduction of mutual recognition of authorised economic operators in the EU and the partner countries; setting up a common risk assessment framework in the EaP; assuring the interoperability of customs information systems for better exchange of information and setting up global anti-counterfeiting and anti-piracy systems.

eCommerce for SMEs

The participants are focusing on the harmonisation of eCommerce legislation and addressing the fragmentation of market practices, to assure the required infrastructure investment and implement cross-border paperless procedures. They also agree to launch actions for the harmonisation of legislation for Internet security & privacy of eCommerce services, online business environment, digital contracting, intermediary liability, protection of consumer rights, and for promoting competition and access to foreign markets through cross-border eCommerce, ePayments and eLogistics solutions.

eLogistics and Digital Transport corridors

The participants are creating cross-border links of transport infrastructures and transport corridor connections between the EU and partner countries, as well as multimodal eLogistics platforms. Such platforms will provide a portfolio of integrated added-value services to the main players of the supply chain - customs and tax authorities, trading companies, railway and cargo operators - contributing to the development of the pan-European Digital Transport Corridors between the EU and the partner countries.

2. Key Enablers

Electronic identification and trust services

The participants are sharing best practices (e.g. the eIDAS Regulation and the Digital Service Infrastructures under the Connecting Europe Facility) and promote the transfer of know-how in eGovernment interoperability in general and cross-border electronic signatures in particular, in order to improve trade conditions and mobility in the EaP. The EU and the partners will launch further actions aimed at improving relevant legislation and its enforcement in partner countries, for enhancing the protection of online privacy and personal data, building trust in ICTs and eServices

Network and information security, cybersecurity and cybercrime

The participants are using a clear and consistent approach to applicable law and jurisdiction, sufficient (human and financial) resources and very efficient cross-border cooperation for increased security and effective law enforcement in order to safeguard privacy. Critical information infrastructure protection will come an integral part of national, social and economic policy. The participants also agree to exchange experiences and best practices in this area, engaging the EU's CERTs and the European Network and Information Security Agency, for enhancing partner country capabilities.

ICT-based infrastructures for eTrade

The participants are focusing on the development of ICT-based infrastructures for eTrade, trade business process reengineering and creating the proper legal framework for facilitating eTrade between partner countries and with the EU.

ICT-based infrastructures for research and education

The participants are taking part in the launch of the EaP Connect project, a regional high-speed communication capacity linking the partner countries to the pan-European research and education network GÉANT and harmonising Wi-Fi access in the EaP.

Digital skills

The participants are launching actions, including programmes for training and work-based learning (internships/ apprenticeships), aiming to reduce the digital skills shortage in the partner countries, while benefiting from the experiences of EU's 'Grand Coalition for Digital Jobs'. By forming their own national and local digital skills coalitions, countries will add to the already numerous stakeholders, large and smaller companies, education providers and NGOs.

3. Rules and principles for telecoms and Internet governance

Telecom rules

The participants are taking actions aimed at harmonising the telecoms rules between partner countries and with the EU, developing clear broadband policies and targets and implementing the regulatory frameworks that will guarantee competition, investment and growth in the telecoms markets of the partner countries

Internet governance principles

The participants are cooperating for ensuring capacity-building and empowerment; better coordination among technical and non-technical communities; promoting transparency, accountability and inclusiveness and establishment of appropriate rules, in particular regarding accessibility and use of personal data

HDM study reports include analysis of the Digital Markets using as a baseline the EU legal framework, best practices, standards and Information and Communication Technology (ICT) platforms. For each of the HDM areas, the report identifies the EU baseline (that comprises relevant EU legislation, best practices, standards and ICT platforms), conducts stock taking in the six Partner Countries, analyses gaps in the state of play of the digital market, analyses benefits and readiness for harmonization, and identifies follow-up actions needed in the short to medium term for the Region and each Partner Country.

2.2. EU4Digital: Regional Programme on the digital economy and society in the EaP

EU4Digital was launched as the vehicle to support the implementation of the roadmaps established under the Digital Community. The networks serve as platforms for sharing best practices and experiences among partners and with the EU, promoting synergies and developing joint projects.

The network EU4Digital: Trust & Security is focusing on electronic identification, digital trust services, network and information security and cybersecurity, all necessary building blocks for interoperable cross border eGovernment services; Moldova and Estonia are coordinating this work.

The network EU4Digital: eSkills is promoting national digital skills strategies in the partner countries, notably by establishing national coalitions for digital jobs, taking into account the EU's "digital skills and jobs coalition"; Armenia and Latvia are coordinating this work. In 2017 digital skills national coalition was created in Armenia.

The network EU4Digital: ICT Innovation is promoting ICT research & innovation ecosystems in the partner countries, taking into account similar efforts in the EU under "Horizon 2020" and the "Start-up Europe" initiative. The work of this network is expected to improve sharing of research excellence and cross border investments, while offering partners' start-ups easier access to EU markets and vice versa. In this context, the participants welcomed the progress made with EaP Connect, the EU funded project which started in June 2015 and which aims to connect the research and academic communities of the partner countries with the pan European research and education network GEANT; Azerbaijan is coordinating work on ICT research & innovation.

The network EU4Digital: eTrade is promoting interoperable electronic trade services and processes among the partners and with the EU, comprising eCommerce, eCustoms and eLogistics. In connection to this, the participants endorsed the launch of a new study to perform gap analysis in the partner countries on eTrade and eLogistics/Digital Transport Corridors and produce regional harmonisation recommendations on these topics; Belarus, Lithuania and Azerbaijan are coordinating this work.

EU4Digital: e-Health workshop was held to identify common challenges for the partner countries and issue regional harmonisation recommendations for the Eastern Partnership; Georgia is coordinating the work on eHealth.

As a next step, the participants proposed that each of the EU4Digital Networks develop a roadmap for the period 2017-2019 in their respective thematic area, focusing on concrete and achievable deliverables, which aim at improving the life of citizens and the competitiveness of businesses. Each roadmap should include annual milestones, the first being in June 2017 before the EaP Summit.

2.3. Regional Programme on Statistics with Eurostat in the EaP

A new regional EaP programme on Statistics is under preparation for 2017-2020. The overall objective of this programme is to increase evidence-based policy-making in the EaP region, based on more and better-quality statistics provided by the EaP National Statistics Institutes (NSIs). The main activities will be:

- Technical assistance in priority areas (including information society and use of ICTs), focusing on increasing data availability for beneficiaries, namely on collection of data that are compliant with EU requirements and will be published by Eurostat.
- Preparation and implementation of surveys to further enhance and help to coordinate statistical data collection from the EaP countries. This should allow harmonising the reference periods,

release dates and presentation standards. As a result, a wide range of users may have access to data at not only the national, but also the regional and European levels.

- Trainings, seminars, workshops to contribute to improving the statistical knowledge of staff from the EaP countries on many statistical domains and horizontal issues (e.g. governance of NSSs, management of resources, quality etc.).
- Production of statistical publications for the EaP region providing harmonised regional data.

Implementation of actions is expected to start in the middle of 2018.