

Rapid Quality Infrastructure Market Potential Assessment for Armenia

Executive summary of the scoping study on QI services for green and digitalized value chains
Project: Quality Standards for Increased Trade in the Eastern Partnership Countries,
PN: 2021.2236.4

Reporters: Nune Darbinyan, Filip Ashikyan

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1 PRELIMINARY REMARKS

The European Union is working with Eastern Partnership Agreement (EaP) countries (Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova, and Ukraine) to promote environmental and climate resilience and digital transformation. In this context, PTB is implementing the project "Quality Standards for Increased Trade in the Eastern Partnership Countries", PN: 2021.2236.4. This project aims to build the quality infrastructure (QI) necessary for a sustainable and digital transformation.

This study describes the potential of the QI of the Republic of Armenia to make a significant contribution to green and digital transformation. The QI services are crucial for an economy based on the division of labour to function efficiently and effectively. Standards, measurement, and testing ensure trust between economic actors and smooth production and distribution flow. Sustainable production methods require appropriate evidence to prevent greenwashing. The digitalisation of the economy and the QI services is also necessary here. Ultimately, QI enables EaP countries to participate in international trade and to develop their economies sustainably. The study analyses existing publications and policy documents on the country's economy, development, and quality infrastructure and interviews conducted in Autumn 2022. The research is guided by the Calidena Guide and Toolbox (www.calidena.ptb.de).

2 NATIONAL ECONOMY AND QUALITY INFRASTRUCTURE ASSESSMENT

The diversification of markets and introduction of innovative products is crucial for the development of Armenian economy especially in view of the green and digital transformation. Areas of the EU Green Deal offer strategically relevant entry points for Armenia in the light of current bilateral partnership with EU. Armenia has seen a troubling pattern of export growth, with the largest contribution to export growth coming from low and moderate complexity products, particularly Ores, Slag and Ash and Information and Communications Technology (ICT) products, with export growth over ten years, accordingly 29.88% and 10.69%. According to international studies, the Potential Growth Opportunities for Armenia are classified according to diversification into new strategic products with increasing complexity. Strategic new products shall aim to balance a distance to market, more complex products to support higher wages, as well as the higher values holding more links to other high-complexity products.

The Government of the Republic of Armenia has adopted country's new Program in 2021. The goals of the Government's economic policy are expansion of economic opportunities and providing equal access; increase of the prosperity of the middle class and reducing poverty; provision of export promoting conditions and designing environment for this. The "Program of the Government of the Republic of Armenia" identifies following main sectors and priorities, such as Processing Industry; Sustainable Development and Green Economy; High Technologies; Agriculture; Tourism; Quality Infrastructure; Urban Development; Sustainable management of natural resources; Development of Infrastructures; Human capital development; Institutional

development. According to the Program the concept of digital economy is on its way to digital access to key infrastructure for the economy and quality improvement.

The Government considers importance of RA-EU Comprehensive and Extended Partnership Agreement (CEPA) relating to trade and commerce. Expansion and deepening of cooperation in trade is also planned with the World Organization (WTO) for trade facilitation, expanding foreign markets and increasing market access purpose.

Armenia considers enormous and not yet fully assessed capital and potential of Armenian Diaspora that is a carrier of know-how and investment capital and is interested segment of Armenian population worldwide. The current digitalization trends have created number of advantages for RA, such as private investments, repatriation of IT know-how from diaspora, booming start-up businesses based on digital technologies of last five to ten years.

The complexity of the economy is considered by the Government as a strategic goal, for which it aims to take steps to contribute to the deepening of the value chains of the production of goods, which implies the presence of technologically more complex and high value-added products and production processes. Sustainable development and Green Economy are part of strategy and foreseen to reduce the role of natural gas in industry, prepare electricity transmission infrastructure for demand growth, prepare the transition of infrastructure to alternative transport, to facilitate the acquisition heating systems by the population. Armenia's limited natural resources dictate the imperative of efficient use and conservation of natural resources in economic processes. The Government Program is announcing harmonization of environmental legislation of RA in the light of instructions of CEPA, signed with EU, and in the context of the expansion of international cooperation and countries obligations undertaken in the framework of global and regional environmental conventions (FCCC, other). Digitalization of economy is a key requirement for RA. In this direction it is planned to carry out the measures such as identification and recognition of competences; introduction of information and cyber security management systems, increasing literacy; development and implementation of the main standards of the digital environment; digitization of public services, their online access provision, establishment of unified service centres; exclusively electronic inter-public communication and public-society communication; digital literacy of the population, increasing use of digital tools, access to internet; cyber security and evidence-based policy making.

3 QI MARKET POTENTIALS PROVIDING SERVICES FOR GREEN VALUE CHAINS

Based on the assessment of the national economy, including the government's policy development priorities and development cooperation priorities, the consultancy identified 5 following value chains (products and services) that meet the criteria as indicated in Table 1 below.

VC Pharmaceuticals / Drugs / Therapeutics. Armenia's pharmaceutical industry registered a constant growth over the past decade into one of the country's most dynamic sectors of the economy. In 2019, the manufacturing of pharmaceutical products in Armenia rose by 4.1% vs 2018 to 20.1 mln USD and made about 0.5% of the whole Armenian industry. There are 24 pharmaceutical companies with licenses to produce medicine in Armenia with product quality as high priority among manufacturers. More than 360 registered medicines are manufactured in Armenia. The pharmaceutical industry is one of the export-oriented industries in Armenia. Approximately 50% of locally produced medicines are exported. The key foreign markets for Armenian companies comprise the CIS, with a predominance of Central Asian countries and Russia, Georgia, Belarus, Ukraine. Armenia exported about 21.3 mln USD worth of pharmaceutical products in 2018.

Armenia has strong human capital in Biochemistry, Molecular Genetics and Microbiology supported by prominent academic and research institutions. Manufacturing of generics, APIs, vaccines, and, with 2500 medicinal herbs growing in Armenia, herbal medicine has a huge potential to be used. The GMP standards are introduced in the sector. At the crossroad of Biology, Chemistry, Physics and Artificial Intelligence (AI) Armenia

demonstrates significant progress in novel therapeutics using state-of-art AI technologies. These technologies may reduce environmental negative aspects, have positive impacts on medical technologies with faster solutions, more precise validations, health, etc.

As for ICT and digitalization in Armenia and in pharmaceuticals, the country is steadily turning into a new regional hub of advanced technology and innovation. As of 2018, almost 800 IT companies, including internet service providers, generate a turnover of 920 mln USD. 200 companies are involved in R&D, 43% of which create their own products. Noteworthy, 95% of these companies started their activity in the 2018. The industry is growing at 20% a year and should comfortably reach the billion-dollar export mark. Armenia has already secured its place on the IT map of the world, and this sector is one of the locomotives of the economy. The Armenian government approved the country's Digitalization Strategy, which envisages digital transformation of the Government, the economy and the society through the introduction and development of innovative technologies, cyber security, data policy, e-government systems, coordination of digitalization processes, and the creation of common standards.

The **potential role and demand for QI** is that sector players require support in their advancement with products on the market, e.g. for international market each player requires preparations, such as dossier for each product, bio-equivalency (for solid drug forms). Another important point is lab testing capacities for drugs and GLP inspection practices before their registration abroad. There is a number of Contract Research Organizations (CRO) in Armenia that help medical equipment, biotech and pharmaceutical companies to achieve their goals for recognition. Calibration methods and validation worldwide are important. Regarding **digitalization**, IT support to drug development, experimenting, registration is of high priority. Considering close relevance to IT and to Biochemical Science and Physical Science, the PTB expertise in biochemical, medical aspects, including metrology for clinical research, DNA analyses, calibration will give their yield and boost for both Artificial Intelligence (AI) platform and therapeutic science/industry.

VC Textile. Textile bears strategic importance for the Armenia's economy. The clothing industry's production volumes in 2020 compared to 2019 increased from 56.3 mln USD to 59.8 mln USD. In the period of 2018-2020, the sector registered an increase of 28% in the production of clothing. In 2019 compared to 2014, it recorded almost 4 times growth in AMD value with comparable prices. The 35 textile and 110 clothing companies are operating in Armenia. Armenian textile/clothing companies are also famous for subcontracting for world-known brands. The export of Armenian clothing reached 169.4 mln USD in 2020, with the main export destinations in Russia, Italy, and Germany. To stimulate sector, the government has implemented assistance programs to attract foreign investors. Armenia's clothing sector has rich experience, production traditions, skilled professionals, and lower cost. Sector has a reputation for the workforce's ethical treatment, which is an increasingly important factor. Energy costs are competitive. Textile strategy paper is announcing sector as one of main strategic priorities and is aimed at the development of sustainable and inclusive textile industry in Armenia. The sector is expected to be a locomotive for development of sheep or cotton production domestically.

The **potential role and demand for QI** includes standards for laboratory methods, measurements, calibration capacities and conformity assessment. It also applies to lab capacities for measurement of all necessary parameters by industry and private labs, testing methods to measure composition, chemical and physical parameters, safety of textile (now few industries can measure only length and thickness), as well as calibration of equipment and validation of methods. Trainings for industry representatives, labs, calibration labs, certification bodies, accreditation staff shall be conducted. As a green niche the Armenian textile producers shall be introduced to organic and bio textile markets. Private standards on safety and environmental friendliness, such as Textile exchange, Organic Textile shall be introduced to industry and certifiers. Concerning **digitalization**, textile manufacturers have potential to get introduced to digital tools to drive sustainability and growth.

VC (Organic) Packaged Dried Fruits, Wines. Food processing is a well-developed industry in Armenia with a long-established tradition of producing high-quality processed food, advanced logistic and distribution services. The country's unique soil and climate provide conditions for growing agricultural species that are famous for their quality. Dried fruits, jams, juices, preserves have great demand in the domestic and foreign markets. Armenian wines are dated back to many millennia and now experience their renaissance. Armenia's alpine landscape, rich biodiversity and potential of beekeeping support honey production as an emerging economy. The manufacturing of food products is one of the key subsectors of the processing industry, with a share of 39%. In the period of 2018-2020, the subsector increased by 64%. In 2020 the production of food was worth about 1 billion USD. New vineyards were established, and new wineries opened every year. Today the total vineyard surface is 16.700 ha, and the number wineries has reached 67. There are more than 400 indigenous grape varieties, 50 of which are used in winemaking. The field has also become attractive for local and foreign investors. State policies exist to support food and wine sectors. Exports of Armenian processed foods and wine have been increasing immensely over the last five years, at a rate of 15-20% per annum for all sub-sectors diverse. In 2020 it constituted 22% of total export.

Considering the **potential role and demand for QI**, modern accredited testing methods for measuring pesticide (600+) (including in organic products) are crucial and accredited laboratories with international recognition are essential for the parameters demanded by international markets. Further promotion of organic agriculture and food/wine as greening economy factor, as well as promotion of organic certification in VCs as a guarantee for sustainability, is required. There is a need in trainings in international organic standards. Geographic indications and relevant conformity assessment is defined. Lab capacities (third party and industry), testing methods and parameters, calibration methods shall be studied and introduced. Greening / sustainable wine standards and methods, such as biodynamic and organic, other private label standards shall be explored and introduced. Limits of sulfur dioxide in line with EU requirements shall be measured locally (by internationally accredited local labs) for reliability reasons. In terms of **digitalization**, as organic means full traceability, food safety and brand trust, the Armenian Organic Brands shall be created along with introduction of digital solutions. Digital trends applied to the vine and wine sector shall be studied and introduced, e.g. simple, fast, and inexpensive methodologies to classify wines, to trace geographic origin, winemaker, grape variety, to prevent fraudulent activities. Main digital trends in the vine & wine sector, such as Internet of Things (IoT) / Sensorisation; Artificial Intelligence; Robotics; Satellite Imagery / Geographical Information Systems (GIS); Blockchain; E-Label; E-Certificate; Smart Storing, etc., can be introduced to the sector.

VC Leather processing, leather apparel and shoes is emerging sector in economy of Armenia and shows great potential. Greening of leather processing technologies, new greener standards throughout VCs from livestock to ready items are crucial considering it as highly poisonous and toxic industry. The leather industry sector potential is currently assessed and draft policy paper is waiting for approval. Coordination with livestock and cattle programs is expected, as the good quality of leather is closely related to animal welfare.

The **potential role and demand for QI** represents in introduction of cleaner technologies, standards for leather industry. Trainings in cyclic production, waste reduction, contamination and toxicity free standards and measurements shall be conducted, as well as research and introduction of available technologies for their potential use in Armenia. Lab capacities, prerequisites for cyclic leather, sustainable and social fair standards are needed along with the availability of calibration laboratories. Toxicity and residue measurement methods in water, air, soil are required.

Table 1. Matrix for the selection of the value chain

Criteria/Products	VC1 Textile	VC2 Pharmaceuticals	VC3 Dried Fruits	VC4 Leather	VC5 Wines
Importance for GDP and employment	3	3	3	2	3

Trade relevance: import/export	3	3	3	2	3
Priority of National Development Plans, political support	3	3	3	3	3
High Priority for Green Deal and digitalization	3	3	3	2	3
Qi relevance / identified gaps (Increased need for action around safety, health, environmental protection, and quality)	3	3	2	3	2
Existing external support (GIZ, other)	3	1	3	2	3
Interest, motivation of VC actors	3	3	3	2	3
Total	21	19	20	16	20

4 RECOMMENDATIONS

The competitiveness of small and medium-sized enterprises (SMEs) needs to be improved by the existence of functioning metrological services, such as instrument calibrations. Those services are necessary to prove the quality and safety of products, which is a prerequisite for export. Meantime the capacity of local industry and private QI service providers also require improved competitiveness and skills.

To support Armenian QI to adopt more demand-driven approach, PTB project intends to work with the Armenian QI institutions on one selected value chain by applying CALIDENA methodology. During the workshop held on November 2nd, 2022, the analysis of the defined priority VCs and QI support for their greening and digitalization was introduced to the government, main QI institutions and sectoral stakeholders.

As follow up, the Ministry of Economy determined the pharmaceuticals sector as a first VC for the "CALIDENA" pilot. Main argument is that the pharmaceuticals sector has strong input to diversification of economy of the country, to the exports, to the employment rates, to digital perspectives. Meantime, Armenia possesses the strong backup of research and scientific background. The sector expectations from know-how existing in EU and PTB are obvious. This sector is dominated by SMEs, which demand diverse QI services and capacity building needs. QI services and their improvement are of high importance to pharmaceuticals sector. In view of the above, understanding the importance and urgency of the topic which also includes the challenges of the existing and pending regulations and procedures to be enforced, it is recommended that the project considers pharmaceuticals sector as a first priority for the support via CALIDENA methodology.