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ENTERPRISE DEVELOPMENT AND MARKET COMPETITIVENESS (EDMC)

**QUALITATIVE AND QUANTITATIVE ANALYSIS IN THE
SELECTION OF VALUE CHAINS FOR THE EDMC PROJECT
FINAL REPORT**

January 19, 2012

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ENTERPRISE DEVELOPMENT AND MARKET COMPETITIVENESS PROJECT

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FINAL REPORT

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List of Acronyms

3 D	Three dimension
BDS	Business Development Services
CAD	Computer-Aided Design
CAE	Computer-Aided Engineering
CAPS	Competitive Armenian Private Sector
CIS	Commonwealth of Independent States
DRC	Domestic Resource Cost
EDA	Electronic Design Automation
EDMC	Enterprise Development and Market Competitiveness
GDP	Gross Domestic Product
GMP	Good Manufacturing Practice
GOA	Government of Armenia
HS	Harmonized System
ICT	Information and Communications Technology
IMPACT	Integrated Model for Policy Analysis Computer Template
ISIC	International Standard Industrial Classification
IT	Information Technology
PNA	Product Network Analysis
R&D	Research and Development
SME	Small and Medium Enterprises
SWOT	Strengths/Weaknesses/Opportunities/Threats
USAID	U.S. Agency for International Development
USD	U.S. dollars
USG	U.S. Government
VC	Value Chain

Definition of Technical Terms

Comparative Advantage	Comparative advantage refers to the relatively unchangeable characteristics that a country has that enhance its ability to export or compete with imports. These include the natural resource base; agro-climatic conditions; population size and density; level of GDP; human capital that has been created in the past through education and training; specialized skills developed on the job; local research and development; cultural traditions; geographic, linguistic, and cultural proximity to markets; specialized informational advantages within niche marketing networks; basic infrastructure for transportation, telecommunications, electrical power, and other major public services; and the existence or ready availability of appropriate technology.
Competitive Advantage	Competitive advantage refers to the relatively changeable characteristics that a firm has that enhance its ability to export or compete with imports by having lower costs or superior products. Competitive advantage depends on the business environment in which the firm operates as well as factors internal to the firm,
DRC	Domestic resource cost (DRC) is the ratio of the economic cost of domestic resources, such as land, labor, and capital, to the economic value added that is created. When measured in terms of a common currency that reflects the true economic value of foreign exchange, the DRC ratio is an indicator of the comparative advantage that a country has in producing a given product either for export or as a substitute for similar imports.
DRC Analysis	DRC analysis not only calculates the DRC indicator of comparative advantage, which is closely related the economic profitability of the entire value chain. It also estimates financial profitability measured in terms of the costs and prices faced by producers, processors, and traders at each step along the VC.
Harmonized System	The Harmonized System (HS) is the standard international classification used to record customs data and thus statistics on international trade.
PNA	Product network analysis (PNA) analyzes the relative proximity of a given product to goods with comparative advantage in the overall export structure. If the process of production requires very similar inputs (resources and skills), the products are "closer" to each other; if, by contrast, capabilities differ substantially, they are 'farther' apart, and the prospect of increasing exports is corresponding lower.
Revealed Comparative Adv.	Revealed comparative advantage is a measure of comparative advantage based on export performance of a given product in a given country relative to all that country's exports in comparison

with total world exports of that product relative to total world exports of all products.

Sector	A sector is a broad grouping of industries that corresponds to the two-digit level of the ISIC
Subsector	A subsector is a narrower grouping of industries that corresponds to the three-digit level of the ISIC. Most firms operate at the level of the subsector.
SWOT Analysis	Strengths/weaknesses/opportunities/threats (SWOT) analysis examines these various characteristics of a sector, subsector, or value chain as a way of evaluating its potential for expansion.
Value Chain	In the first instance, the value chain corresponds to a chain of activities that produce and deliver a specific product in a specific location to a specific market. In common parlance, “value chain” is also used to refer to a broader grouping of individual product to market chains.

Executive Summary

This study was undertaken for the purpose of helping to identify those value chains (VC) within the Armenian economy that have the greatest potential for increasing incomes and employment through expanding exports. This identification occurred through a combination of objective qualitative and quantitative analyses centered on the tools of domestic research cost (DRC) analysis, strengths/weaknesses/opportunities/threats (SWOT) analysis, and product network analysis (PNA). The final selection, based on both qualitative and quantitative results, was both realistic and flexible based on criteria that had been previously established as the project's objectives. The outcome is a list of priority value chains and amalgamations of value chains that offer the best potential for success.

The general approach used in the study was to start with a broad number of potential candidates, chosen because they passed a threshold of average exports over the past five years equal to at least 500,000 USD. This pool was then narrowed down through a pre-selection process to 20 subsectors comprised of 40 individual value chains, defined sufficiently narrowly so that the quantitative analysis could be undertaken. The results of the quantitative analysis were then combined with those of the qualitative analysis using a system of weighted points, reflecting the EDMC project's various objectives as expressed in the project documentation. The resulting ranking was used, along with the combining of some individual value chains into more manageable units for purposes of implementation, in order to identify the leading candidates for project assistance. This process and its results were presented to and discussed with USAID in order to arrive at the following groups of value chains:

- **High Tech:**
This sector includes a variety of VCs, initially subdivided into five general categories:
 - **Mobile and Wireless applications** - Software development for smart phones, tablets, and wireless devices; including next generation technologies: bio-informatics, cloud computing, global information systems, large scale knowledge bases, etc.;
 - **Computer graphics and Visualization** - 3D modeling/design, multimedia, and computer games;
 - **Embedded systems and EDA** - Design of printed and integrated circuits, electronic design automation, embedded software for electronics and parallel computing;
 - **Web and Internet applications** - Web design and development, including such telematic services as e-commerce, distance education, telemedicine, etc.;
 - **Engineering design and services** - Computer-aided design (CAD) and computer-aided engineering (CAE), mechatronics, testing, measurement, and R&D, with the possibility to eventually grow out into engineering products.
- **Hospitality:**
EDMC will be considering targeted interventions, to include a combination of rural and cultural tourism, and with a special focus on developing the concept of service provision.
- **Food Processing:**
This subsector includes processed fruits and vegetables, juices, and herbal products. It also includes, as part of the value chain, production and marketing of fresh fruits and vegetables.
- **Pharmaceuticals/Bio-Technology:**
EDMC will start activities in the sector of generic pharmaceuticals. The role that the project can play in aiding biotechnology and its links to pharmaceuticals will be

expeditiously researched and clarified and a pilot pharmaceuticals application support initiative will be identified and launched.

In addition, EDMC will help build service delivery capacity in the Business Development Services (BDS) sphere with a number of activities to improve/enhance their performance and with a particular focus on enabling greater specialization and more market-relevant impact in service provision (e.g., accounting/finance, quality standards, marketing...). Part of this will be accomplished by engaging BDS companies on a competitive basis in providing assistance to the core subsectors and VCs.

In sum, there is a clear set of primary activities for the EDMC project that have been identified for follow-up work over the near to medium term. What EDMC will now focus on intensively is the formulation of a series of detailed VC work plans that will guide this work over the next year.

1. Introduction

1.1. Objectives of the Study

This study was undertaken for the purpose of helping to identify those value chains (VCs) within the Armenian economy that have the greatest potential for increasing incomes and employment through expanding exports. This identification occurred through a combination of objective qualitative and quantitative analyses centered on the tools of domestic research cost (DRC) analysis, strengths/weaknesses/opportunities/threats (SWOT) analysis, and product network analysis (PNA). The final selection, based on both qualitative and quantitative results, was both realistic and flexible based on criteria that had been previously established as the project's objectives. The outcome is a list of priority value chains and amalgamations of value chains that offer the best potential for success.

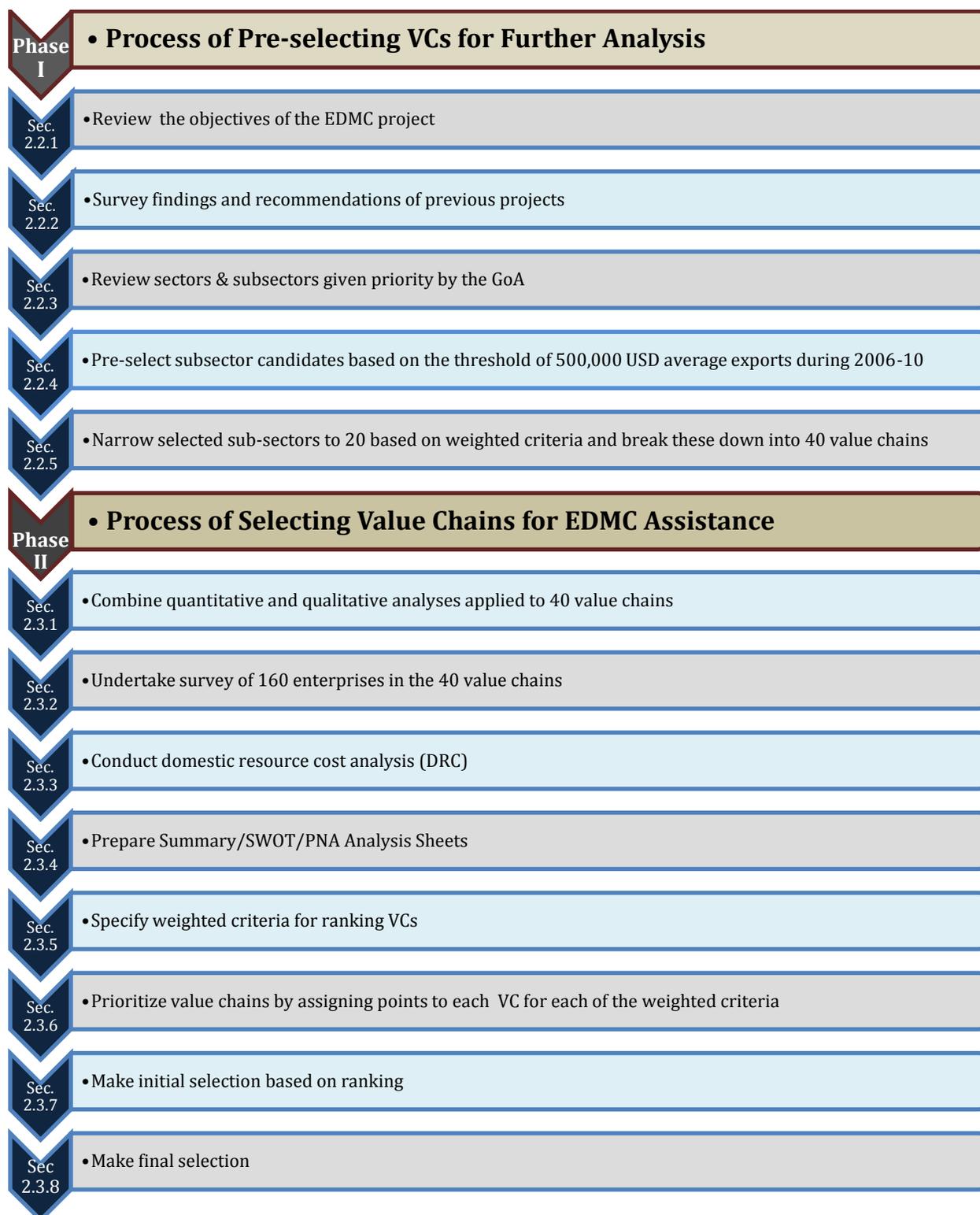
1.2. General Approach

The general approach used in the study was to start with a broad number of potential candidates, chosen because they passed a threshold of average exports over the past five years equal to at least 500,000 USD. This pool was then narrowed down through a pre-selection process to 20 subsectors comprised of 40 individual value chains, defined sufficiently narrowly so that the quantitative analysis could be undertaken. The results of the quantitative analysis were then combined with those of the qualitative analysis using a system of weighted points reflecting the EDMC project's various objectives as expressed in the project documentation. The resulting ranking was used, along with the combining of individual value chains into more manageable units for purposes of implementation, in order to identify the leading candidates for project assistance. This process and its results were presented to and discussed with USAID in order to arrive at the groups of value chains presented in this report: High Tech, Hospitality, Processed Food, and Pharmaceuticals/Bio-Technology. The steps involved with this process are summarized in Figure 1, with references to the sections where each step is discussed.

1.3. Organization of Report

The next section of the report describes in detail the methodology used for the selection of VC as well as each step in its implementation. This is followed by the reporting of the initial results of that process and how these were modified to produce the final results. The final section of the text presents some conclusions of the analysis. Annexes present the detailed reasons for choosing selected value chains at each stage (Annexes A and B), survey questionnaires (Annex C), an example of the IMPACT computer template used for DRC analysis (Annex D), and detailed summary sheets for each of these final VC groups (Annex E).

Figure 1: Flowchart of Methodology and Process Used for the Selection of Value Chains



2. Methodology for Selection of Value Chains

The selection of value chains (VCs) for support under the Enterprise Development and Market Competitiveness (EDMC) Project was undertaken in two phases. The first involved the identification of subsectors with a strong potential for increasing incomes and employment through growth of exports. The second comprised the application of domestic resource cost (DRC) analysis, strengths/weaknesses/opportunities/threats (SWOT) analysis, and product network analysis (PNA) to more narrowly defined value chains within these subsectors. The purpose of this was to assess comparative advantage, through the DRC analysis, as well as qualitative factors influencing competitive advantage, using the SWOT and PNA analyses, in order to determine which VCs should receive the highest priority and which, if any, should be held in reserve.¹

The next subsection of the report sets out the conceptual framework for the selection of subsectors and value chains, followed by a detailed description of the steps undertaken in each phase.

2.1 Conceptual Framework

Domestic resource cost (DRC) is an indicator of the efficiency with which a country's domestic resources, such as land, labor and capital, are converted into useful output. More precisely, it is the ratio of the true economic cost of these domestic resources to the true economic value added that is created. When measured in terms of a common currency that reflects the true economic value of foreign exchange, the DRC ratio is an indicator of the comparative advantage that a country has in producing a given product either for export or as a substitute for similar imports. If the cost of domestic resources is less than the value added benefits created, the DRC is less than one and the country has a comparative advantage in producing the product; if the reverse is true, the DRC is greater than one and the country has a comparative disadvantage. The goal of the DRC exercise is not only to see whether a country has a comparative advantage or disadvantage in producing a particular product but also to rank that product relative to other products. The lower the DRC, the greater is the comparative advantage.

The DRC analysis not only calculates the DRC indicator of comparative advantage, which is closely related to the economic profitability of the entire value chain. It also estimates financial profitability measured in terms of the costs and prices faced by producers, processors, and traders at each step along the VC. There may be a number of reasons why financial prices differ from economic prices, but the most important of these relate to government taxes and subsidies on inputs into the value chain and trade policy regarding exports of the chain as well imports of competing products. These trade policies consist of taxes, subsidies, informal payments, and quantitative restrictions imposed by the government or government officials.

¹Herein we define the terms sector, subsector, and value chain with reference to the International Standard Industrial Classification (ISIC). A sector is a broad grouping of industries that corresponds to the two-digit level of the ISIC, such as processing of food products, high tech, and tourism, Below this at the three-digit level is the subsector, which is applied to processing fruits and vegetables, data processing, and travel agency and tour operators. Finally we define a value chain, in the first instance, as referring to a specific product and a specific market. According to this definition, there are in most cases a number of value chains within a given subsector. However, in common parlance, "value chain" is also used to refer to a broader grouping of individual product to market chains. Furthermore, as we shall see, the final determination of the value chains to be supported under the project involved a grouping of several individual value chains, as defined in the selection process, into larger groups of value chains at the sector or subsector level. Thus both definitions are useful. We will try to be clear about the differences.

There are several reasons why a country has a comparative advantage in producing some products and a comparative disadvantage in producing others. One important source of comparative advantage is the natural resource base. Closely related are agro-climatic conditions. Also important are population size and density and the level of GDP, which determine, among other things, population pressure on the land and the potential for economies of agglomeration and scale. Another source of comparative advantage is the human capital that has been created in the past through education and training, specialized skills developed on the job, local research and development, cultural traditions, and so forth. Geographic, linguistic, and cultural proximity to markets are also important, as are specialized informational advantages within niche marketing networks that may have evolved over time. Closely related is the existence of basic infrastructure for transportation, telecommunications, electrical power, and other public services. Finally the existence or ready availability of appropriate technology can be an important source of comparative advantage. What is critical in distinguishing the sources of comparative advantage is that these change, if at all, only slowly over time. Thus they can be considered as exogenous.

At the other end of the spectrum lies competitive advantage. As defined by Michael Porter, this consists of a firm having lower costs and a superior product.² Firm-specific resources, such as patents and trademarks, proprietary know-how, brand image, and reputation of the firm, along with the enterprise's ability to utilize these resources effectively, enable the firm to gain a competitive advantage. In the EDMC Project we are concerned less with a firm's competitive advantage vis-à-vis other firms within the same VC in Armenia and more with the competitive advantage of the Armenian VC compared with the same VC in other countries.

A VC's competitive advantage vis-à-vis other countries will depend on a number of factors. First there is the basic comparative advantage of the value chain. If the subsector is one in which Armenia has a fundamental comparative advantage, then efforts to promote this subsector are much more likely to succeed than if Armenia does not have that comparative advantage. Comparative advantage is measured quantitatively by the DRC indicator during Phase II. During the pre-selection process in Phase I, however, the likely sources of comparative advantage or disadvantage are identified qualitatively so as to assist in the pre-selection process.

Second is the business environment in which the firms of the subsector operate. This environment includes the public policy enabling environment, educational and training institutions, banks and other financial institutions, marketing and standards organizations, professional and trade associations, business development service (BDS) providers, and a number of other institutional structures that are external to the firm. The enabling environment consists of government legislation, regulatory structures, judicial institutions, enforcement mechanisms, level of corruption, and the degree to which the political system can formulate and implement policies that encourage investment and growth. Also important are the education and training institutions that create the management and technical skills needed by particular subsectors. Financial institutions with experience in lending or investing equity capital in the subsector are important, as are marketing organizations that can identify and develop marketing opportunities, including adherence to product grades and standards. Some elements of the business environment are specific to the subsector and others apply more generally across the economy. What is important here is how this environment impacts the firms of the subsector.

² Michael Porter, *Competitive Advantage; Creating and Sustaining Superior Performance*, Free Press, 1998.

Third are factors internal to the firm, especially those that allow it to keep costs low and produce products that are deemed by purchasers to be superior to the products of other firms, especially those outside the country. These factors include quality of management, capacity for innovation, access to finance, quality of accounting and logistics systems, access to appropriate skills and technology, etc. While the EDMC may have a one-on-one relationship with firms within VCs being assisted, it is likely that it will also operate via institutions at the sector or subsector level, such as trade associations and BDS providers.

It is important to choose VCs in which Armenia has a basic comparative advantage, since the factors determining this advantage cannot be changed, at least in the short to medium term. It will also be important to look at each potential VC from the perspective of its current competitive advantage and the constraints that impede it from developing that advantage further. For example, an agro-processing firm may lack a competitive advantage in European markets because it is not HACCP or ISO 22000 certified, but the constraint that prevents it from acquiring that certification may be an absence of access to the finance needed for the certification. It is also important to make a judgment as to whether the benefits from overcoming these constraints will be worth more than the costs of overcoming them.

Choosing from among the VCs that appear to have a comparative advantage those that are the best candidates for DRC analysis requires the following actions:

- Identification of the most binding constraints on firms within the subsector.
- Determination of the best way in which to alleviate these constraints. In some cases this will involve changing or taking advantage of the business environment. For example, trade policy reform changes that environment, while working with educational/training institutions to make their programs more relevant for the subsector takes advantage of the environment. In other cases, alleviating the constraints will involve direct assistance to the firms, e.g., to improve their accounting systems.
- Rough estimation of the cost of alleviating the constraints and the benefits to be achieved. In principle, this estimation could be done quantitatively, but in practice the time and cost required for this analysis would not be justified, especially at the pre-selection stage. So more informal judgments have to be made.

2.2 Phase I: Pre-selection of VCs for Further Analysis

2.2.1 Review Project Objectives

Phase I began with a review of the objectives of the EDMC project in order to make clear the underlying rationale for selection of the value chains on which the project will work. From the project documents, the following were identified as important objectives:

- Raise incomes and employment in Armenia by promoting growth in selected value chains (VC) with export potential;
- Focus on Small and Medium Enterprises (SMEs);
- Stimulate innovation, enhance workforce skills, accelerate new enterprise formation, improve access to finance, address key bottlenecks in the enabling environment;
- Assist target VCs to reach new markets and expand existing markets;
- Contribute to development of a knowledge economy; and
- Act as a catalyst, mobilizing additional resources from other sources.

2.2.2 Survey Previous Projects

The next step was to survey the findings and recommendations of previous projects, such as the CAPS and other projects that have supported agricultural, manufacturing, or service industries in Armenia, to see which subsectors they have identified as offering the greatest

promise. The CAPS project reports, for example, helped to identify subsectors in IT, pharmaceuticals, and tourism. Other projects were helpful with agro-processing.

2.2.3 Priorities of GOA

Attention was also paid to the sectors and subsectors that were given priority by government. Outside of industry, these comprise tourism, information and communications technology, agriculture, healthcare, and education. Within industry, the primary emphasis is on those sectors for which exports are expanding, which have substantial linkages both within the sector and with other sectors, and which lead to an efficient allocation of resources. Secondary considerations include:

- Current exports are substantial.
- There are no serious raw material bottlenecks in the medium term.
- There is actual or potential involvement of the Diaspora.
- Opportunities exist to create high value-added in the longer run.
- The number of firms in the sector is sufficient to make a difference in terms of income and employment.
- Opportunities exist to attract foreign investment.
- There will be an impact on employment and regional development.
- There is an opportunity to create differentiated value.³

To identify the sectors and subsectors that met these criteria, the Government of Armenia (GOA) first preselected those goods or groups of goods categories that had at least 1 million USD worth of exports. Metals mining, metallurgy, and basic metal shaping were left aside because, although these natural resource-based sectors are very important for growth today, they are expected to decline relative to knowledge-based industries in the future. The industries included in the pool were then subjected to two more screening criteria:

- Did they have synergies with current priority sectors and the industrial policy framework?
- Was there time to achieve sector maturity and scaling through initiatives focused on them by the year 2020?

In the end, the final pool consisted of brandy, wine, canned food, bottled water, juice, diamond-cutting, gold and jewelry, watches, engineering, pharmaceuticals and biotechnology, and textiles. Of these, pharmaceuticals and biotechnology, canned food, wine, bottled mineral water, and juice were considered to be the best candidates over the period 2011-15 and engineering was believed to offer the best potential over the period 2011-20. Actions were to be focused on support for the development of production and export capacity (2011-15) and technology transfer and incentivizing innovation (2011-20).⁴ There was no mention of acquiring market information or developing the capacity to penetrate new markets. Thus the emphasis was on the supply rather than the demand side.

2.2.4 Choice of Subsector Candidates

In the pre-selection for the EDMC, the decision was made to cast the net even more widely than the Jumpstart Industrial Strategy by looking at a range of products and services beyond the subsectors in which assistance had previously been offered. In principle, this included most of the economy outside of mining, metallurgy, and basic metal shaping. However, the range of industries was narrowed considerably by the condition that they must already demonstrate substantial exports, though the threshold was placed at 500,000 USD in average exports during 2006-2010, rather than the 1 million USD, which had been the threshold of the Industrial Strategy. Furthermore, services were included along with goods, so the number of subsectors initially included in the list of possible candidates was quite large at 85.

³ Armenia's Export-Led Industrial Policy, Jumpstart Strategy, Yerevan, 2011, pp. 4-6.

⁴ Armenia's Export-Led Industrial Policy, Jumpstart Strategy, p. 13.

The first step in narrowing this list was to drop out subsectors that were

- Highly concentrated and dominated by one or a very few large firms with only a small role for SMEs, e.g., petrochemicals;
- Dangerous from a public health perspective, e.g., cigarettes;
- Mostly re-exports, e.g., petroleum gas;
- Mostly involved in the production of import substitutes rather than exports, e.g., beer;
- Showing sharply declining or very erratic exports, e.g., cement;
- Part of a value chain of subsectors already retained in the selection process, e.g., plastic packing, road transport;
- Too complex to be analyzed, and implementation would likely be difficult, e.g., education and health-related travel; or
- Problematic for the separation of export and domestic sales, e.g., passenger road transport.

This brought the list to 39 subsectors that were retained at this stage. Annex A presents a table of the 85 subsectors that were initially included on the basis of the 500,000 USD average import threshold and the reasons why 46 of these were subsequently rejected.

The subsectors shown in Annex A sometimes group several four-digit Harmonized System (HS) tariff codes when this seems to make sense given the likelihood of firms in the industry producing products found in several HS code lines.⁵ Furthermore, there are no data at the subsector level on exports of tourism and high tech services. However, there is sufficient information at the sector level on these exports to justify their inclusion in the more comprehensive analysis. In moving to the next stage of the pre-selection process, some regrouping and redefinition occurred on the basis of additional information that was acquired. This resulted in the retention of the 28 subsectors shown in Annex B.

2.2.5 Pre-Selection from Candidates

In order to reduce the number of subsectors to 20 for further analysis,⁶ the subsectors in Annex B were assigned points on the basis of the following criteria (with weights shown in parentheses):

- Export potential, which was judged partly on the available data on exports over the period 2006-10 and partly on qualitative information regarding the expansion of existing markets and the ability to penetrate new markets (33.3%);
- Comparative advantage based on a qualitative assessment of agro-climatic conditions, access to raw materials, basic human resources, access to markets, vulnerability to transport costs, existing ICT infrastructure, etc. (13.3%);
- Competitive advantage based on a qualitative assessment of product characteristics in relation to competitors, spirit of innovation and entrepreneurship, level and structure of costs, use of appropriate technology, quality of management, firms in the value chain (suppliers, processors, etc.) that can supply technical advice and trade credit, appropriate financial institutions, marketing and standards organizations, trade associations, tax levels and administration, export/import barriers on outputs and inputs, regulatory structure specific to the subsector, barriers to entry, etc. (13.3%);

⁵ The Harmonized System differs in many cases from the International Standardized Industrial Classification (SIC), which is the basis for classifying most production and employment data.

⁶ The number of subsectors was set at 20, and the number of value chains at 2 on average per subsector, as a compromise between the desire to be more inclusive and the limited time and resources that were available to undertake the enterprise survey and conduct the analysis.

- Degree of sophistication in relation to an increasingly knowledge-based economy (7.7%);
- Impact on income and employment outside of Yerevan (13.3%);
- Linkages with other sectors (7.7%); and
- Importance of SMEs in the subsector (13.3%).

The weights were chosen by the Value Chain Team on the basis of their judgment concerning the relative importance of different objectives of the project and the , as listed in Sections 2.2.1 and 2.2.3. For example, “export potential” was given a very high weight (33.3%) because it is listed in the objectives of both the project and GOA as being crucial to the selection of priority subsectors. “Comparative advantage” and “competitive advantage” were also given fairly high weights (13.3%) because they are critical to the sustainability of exports. The “importance of SMEs” was given the same weight (13.3%) because the project is supposed to work primarily with this target group. “Degree of sophistication” and “linkages with other sectors” were given the lowest weights (7.7%) because they are only listed among either the project’s objectives or GOA’s objectives, not both.

The weighted average of these points was then calculated and the subsectors were ranked by the totals. The rankings and details of the weighted points are shown in Annex B. The following observations pertain to the subsectors that were not selected:

- Undergarments, bathrobes, etc., knitted and crocheted (HS 6107, 6108). This subsector experienced a dramatic contraction of exports during the period 2006-10. Furthermore, Armenia does not have a comparative advantage in the subsector in terms of low labor costs in comparison with countries such as Bangladesh.
- Leather footwear uppers (HS 6409). Although the growth of exports has been strong, this subsector is subject to high production costs and outmoded equipment. There is limited branding capability. It can sell to CIS countries but is not competitive with low-cost producers. Regional and linkage effects are low, since most leather is imported.
- Jewelry (HS 7113). This subsector recently experienced a significant decrease in exports, indicating a decline in competitive advantage. The subsector does not buy gold locally, and its imports of gold are of uncertain quality.
- Electrical equipment (HS 8535-37). Exports have been stagnant. The subsector uses mostly old machinery. It has no regional impact.
- Oscilloscopes, spectrum analyzers, etc.. (HS 9030, 9031). Growth of exports was very weak in 2009 and 2010. The subsector has low regional impact.
- Watches and parts (HS 9101, 9111, 9112, 9113). World demand for watches is declining with increased use of mobile phones. The subsector has no regional impact and few SMEs.
- Road transport (freight) (225).⁷ Road transport has experienced a decline in exports. The subsector is incorporated into other value chains.
- Audio-visual and related services (288). This subsector is characterized by obsolete equipment and outdated skills. There are weak regional and linkage effects.

The results of this pre-selection process were presented to GOA and USAID. It was agreed that some rearrangement of the subsectors would be beneficial to make the selection consistent with government priorities. In addition, it was decided to add garments as a subsector pending

⁷ The classification system for trade in services is different from the Harmonized System used to classify trade in goods. For services, the Extended Balance of Payments Services (EBOPS) classification is used.

finding value chains within this subsector that showed promise. Jewelry was also included even though its ranking was somewhat borderline for the reasons cited above.

Once the top 20 subsectors were preselected, these were broken down into 40 value chains on the basis of the disaggregation that would best permit the implementation of the enterprise survey and detailed DRC analysis. This was subsequently followed at the end of Phase II by an aggregation into groups of the selected value chains that would be most flexible and adapted to the requirements of project implementation. Table 1 presents the subsectors and value chains chosen for further analysis in Phase II.

2.3 Phase II: Selection of Value Chains for Assistance

Following the pre-selection process, the 40 VCs that had been pre-selected were analyzed in greater depth both quantitatively and qualitatively.

2.3.1 Quantitative and Qualitative Analysis

In addition to the DRC analysis, the quantitative analysis looked at sales, employees, exports, imports, number of firms, number of exporters, and number of SMEs for each detailed value chain. Subsectors with substantial potential are likely to reveal this through existing quantitative indicators. One measure of this is the size and growth of exports. Products that are already being exported are highly likely to be those in which the country already has a comparative advantage and the firms within the subsector have a competitive advantage. If the share of exports of these products is growing relative to that of other countries, this is a measure of “revealed comparative advantage”. Products that compete with imports, on the other hand, are more likely to have a comparative or competitive disadvantage, requiring trade protection because of the inefficiency of local production.

Subsectors must be large enough in terms of sales and employment to have a significant effect on the target goals. In addition, the numbers of firms and exporters in the subsector give us a good idea of its competitive structure and export orientation. Finally, the number of SMEs is important because the project is designed to work primarily with SMEs.

This analysis encountered a number of problems.

- Difficulty of matching industry with trade data since the former come from the industrial census, using the International Standard Industrial Classification (ISIC), and the latter come originally from customs data, under the Harmonized System (HS) classification.
- Data are often not available at the level of the VC, but only the subsector or even sector level.
- Data are not available by individual subsector for business services, tourism, and high technology.

While quantitative data provide information about what has been happening in various subsectors, they do not indicate why. They do not provide a complex picture. They do not predict the future for a subsector or industry. For this, one needs to have qualitative data.

Table 1: Subsectors and Value Chains Chosen for Further Analysis

Subsector	Value Chain	H.S. Codes
Fish and crustaceans	Fresh and frozen fish	0301-0305
	Processed fish	1604-1605
Cheese and dairy	White (lori and chanakh type); sheep and goat's cheese; yellow & flavored	406
Fresh fruits and vegetables	Fresh fruits and table grapes	0806, 0809
	Fresh vegetables	0701-0711
	Fresh flowers	603
Processed fruit and vegetables	Processed fruit	2001-2005
	Processed vegetables	2006-2008
	Juices and juice concentrate	2009
Brandy	Brandy	2208
Wine	Wine	2204
Pharmaceuticals	Generic	3004
	Herbal	3004
Clothing (1)	High-end fashion	60-64
	Middle-end garments	
Worked monumental /building stone	Marble (Dimension stone)	6802
Legal, accounting, etc services	Legal services	274
	Accounting & financial management	274
	Enterprise development	274
	Marketing services	274
Bottled water	Mineral and spring water	2201
Diamonds, not mounted or set	Diamond cutting	7102
Articles of jewelry and parts	Jewelry	7113

Tourism	Classical, high income	(2)
	Classical, middle income	(2)
	Rural	(2)
Enterprise software	Software for banking & finance sector (Electronic Queue Systems / on-line banking, accounting, etc.)	(2)
	Software for healthcare and medical devices	(2)
Computer graphics, multimedia, games	3D modeling & design (architecture, construction ind., exterior & interior, etc.)	(2)
	Multimedia (products CD/DVD, visualization applications, database management systems) and Computer games	(2)
Mobile and web apps	Mobile and wireless applications (software development for smart phones, tablets, and wireless devices)	(2)
	Internet applications (e-commerce, etc.)	(2)
	Web applications (web design, development of content management systems)	(2)
Chip design, electronic data automation	Development of microcircuits (ICs/Chips) and Electronic Design Automation (EDA),	(2)
	Embedded software and parallel systems	(2)
Precision engineering services	Computer-Aided Design (CAD) & Computer-Aided Engineering (CAE) services	(2)
	Mechatronics (Robotics, Automation, Telecommunication, Mechanics)	(2)
	Testing & Measurement	(2)
Precision Engineering Production	Printed circuits	8534, 9001
	Parts of tel. sets, tel. for cellular networks or other, etc.	85177

- (1) Two value chains were defined within the textile subsector. One comprised a broad range of middle-end garments, which was substantially different from the undergarments value chain, which had been looked at and rejected earlier. The other value chain was high-end fashion, which had not been analyzed previously. The two cannot be distinguished in the trade or other data, though their methods of operation are quite different.
- (2) Since no or very limited HS data was available for these value chains, a variety of other sources were used. This includes data provided by the Ministry of Economy, the National Statistical Service of Armenia, the Armenian Customs Service, the International Trade Center (UNCTAD), World Bank and UN Comtrade, as well as data provided in reports by USAID/CAPS, the Enterprise Incubator Foundation and EV Consulting.

Qualitative information that was gathered included agro-climatic and cultural factors, financial institutions and availability of capital, regulatory structure, tax regime, trade barriers, marketing and standards organizations, trade associations, access to raw materials, human resources, quality of management, infrastructure, transportations costs, access to markets, market trends, product characteristics, branding, and ease of entry. These analyses used information from a variety of sources, including previous studies and summary notes from the enterprise survey conducted as part of this exercise (see next section).

2.3.2 Enterprise Survey

A survey of approximately 160 enterprises in the 40 value chains (on the average, 4 interviews per VC) was conducted by the EDMC project's partner institutions, Grant Thornton and Global SPC, in order to obtain qualitative data concerning the problems facing the firms in production, raw material supply, marketing, finance, and other areas, as well as quantitative data on costs of production, processing, and marketing; distribution of sales by type of product and destination; and other information. Copies of two of the questionnaires used in the survey are contained in Annex C.

The questionnaires were composed of closed-ended questions to be able to obtain valuable statistical data as well as semi-closed and open-ended questions to provide detailed information on respondents' opinions. The questionnaires were developed in English and then translated in some cases into Armenian. In other cases, such as in the high tech sector, they were administered in English. Pretesting of the questionnaires with a pilot survey was undertaken in the field by the interviewers who were to participate in the implementation of the survey. Based on the feedback from the pilot survey, the questionnaires were revised before final approval.

While the questionnaires were prepared, translated, pretested, and approved, the target companies, farmers, processors, traders, manufacturers, and service providers were chosen. In some instances, the VCs defined in the pre-selection process did not conform very well to the products produced by the enterprises. For example, the Fruit and Vegetable Processing subsector was originally broken down into Vegetable Processing, Fruit Processing, and Juices in order to form continuous value chains involving production and processing by product. However, it turned out that most enterprises produced all of these products, and it was impossible to separate costs by these value chains. The decision was made to combine the questionnaires and cover all three value chains with a single set of interviews. Another sector that posed problems was high tech. First, firms often produce products in a number of value chains. Second, the sector is evolving so rapidly and firms are changing their line of products so quickly that it is often impossible to identify very clearly a particular value chain.

Another set of problems involved cooperation. A number of enterprises did not want to be interviewed. Others agreed to be interviewed but would not disclose their financial information. Still others disclosed this information but it was incorrect. In the end, the interviewers persevered and reasonably reliable information was obtained for each of the value chains, though not necessarily from as many firms as desired. Furthermore, during the analysis, cross-checks were made to verify the reliability of each questionnaire, and especially of the financial information contained therein, in some cases based on the interviewer's previous experience in working with the Armenian companies. Whenever the final result was deemed to be inadequate, the questionnaire was set aside.

The sample of firms was far from random. Interviewers were instructed to get as much information as possible on best practices so as to be able to look at what could be accomplished with some assistance. Often the firms interviewed were the larger, more export-

oriented enterprises. This was desirable since an important objective of the DRC analysis was to evaluate the viability of improved technology in relation to current practices. In addition, attention was paid to potential innovations in technology, development of new markets, and ways of reorganizing value chains in order to focus on issues that are on the frontier of value chain development and not just what is practiced today.

2.3.3 DRC Analysis

Data processing and analysis were undertaken using the Integrated Model for Policy Analysis Computer Template (IMPACT), an Excel based automated analysis tool, which was developed as a standard tool for conducting DRC analysis. Distinct models were constructed from the common template for each value chain, defined with respect to product, technique, and scale of production and processing, as well as location of production, processing, and final sale. An example of this template is included in Annex D.

2.3.4 Value Chain Summary/SWOT/PNA Analysis Sheets

Following the quantitative, qualitative, and DRC analysis of each VC, the results were brought together in a series of summary sheets, with the following information:

- Structure of value chain (VC size/distribution, exports, linkages);
- Quantitative indicators (exports, export growth, sales, employment);
- DRC indicators;
- Comparative advantage/disadvantage (Strength/Weakness);
- Competitive advantage/disadvantage (Strength/Weakness);
- Potential for growth (Opportunities/PNA);
- Major constraints (Threats);
- EDMC areas of potential assistance; and
- Summary

The purpose of these summaries is not only to present the results of the various analyses, but also to follow a logical order. We start with some basic information about the value chain – how it is structured, how much it exports and to what markets, the extent of its linkages with other areas of the economy, its sales and employment. We then move on to the results of the DRC analysis, the most important of which is the DRC itself. This is a measure of comparative advantage of the entire VC, equal to the cost/benefit ratio, defined as the ratio of the real cost of domestic resources to real value added benefit measured in world market prices.

The next section of the summaries is an expansion on the traditional SWOT analysis. It starts by looking at strengths and weaknesses defined at two levels. The first is comparative advantage, which we cannot change; the second is competitive advantage, which we can change. This distinction is important when we look at the impact that the EDMC project can have.

Opportunities are then described in terms of the potential for growth. To the extent that these opportunities are market driven, they involve the logical perspective of product network analysis (PNA), which is a mathematical way of describing the probability that export gains by one subsector may indicate opportunities in another sector. The data are not available to undertake this analysis quantitatively for most of the value chains included in this study, but qualitative recognition of these potential linkages is important. Furthermore, the market analysis that is conducted at this stage includes assessment of where potential markets are and what is necessary to reach them. Qualitatively, therefore, it includes but goes beyond PNA analysis.

The section after this describes the constraints that impede taking advantage of these opportunities for growth, as perceived by the enterprises within the value chain. Following this is a section which suggests what EDMC could do to relieve these constraints. This could involve training and workforce development, creating appropriate financial products, helping to change the enabling environment, assistance in solving technical problems, encouraging the creation and functioning of associations and forums, assistance in identifying markets and creating market linkages, assistance in developing brand names and images, and creating the capacity within BDS providers to provide assistance and training in accounting, marketing, business planning and management, and a host of other areas detailed in the summary sheets.

The summary sheets for the aggregated groups of value chains chosen for project support are presented in Annex E.

2.3.5 Specification of Criteria for Ranking

With summary sheets in hand for each VC, criteria were specified and weighted. Since the DRC was the only objective criterion, and having a comparative advantage was deemed to be critical to future export growth, it was assigned a weight of 35% - roughly one third of the total. All other criteria include a level of subjectivity and possibility for interpretation. Therefore they were assigned lesser weights. These weighted criteria were used to grade each value chain along a number of different dimensions. The total of the weighted points then served to rank the value chains in terms of the various criteria in order to permit quantitative comparisons of the chains. The criteria used for grading were the following:

- Export growth potential (15%). Export growth potential was based on a combination of quantitative and qualitative criteria. The quantitative criteria consisted of average exports over the past five years and rate of growth of exports over the same period. The qualitative criteria included growth trends in Armenia's existing export markets and in the world market, Armenia's competitive advantage in existing and new markets, and the obstacles to Armenia's ability to enter new markets and how easily these can be overcome. A weight of 15% was assigned given the importance of export growth in the objectives of the project and GOA.
- Income growth (5%). Income growth was based primarily on the potential for export growth, but with an adjustment for the relative importance of exports in total sales, since domestic sales generally grow less rapidly than export sales. The weight was only 5% since much of income growth is already captured in export growth potential.
- DRC (35%). The DRC was used as an objective quantitative indicator of comparative advantage and the profitability of the VC in the absence of policy distortions. The reasons for the high weight are given above.
- Job creation (15%). Points were awarded on the basis of income growth with adjustment for the size of the VC and its degree of labor intensity. This criterion also received a high weight because of its importance in the project's objectives.
- Capacity to overcome supply constraints (10%). Supply constraints are those that would inhibit supply if there were no constraints on demand. Examples include lack of access to or rising costs of raw materials, shortage of workers with required skills, old and outmoded equipment, inefficient technology, etc. Capacity to overcome these constraints depends on access to additional sources of raw materials, labor force training facilities, financial products on reasonable terms, appropriate technology, etc. This capacity may already exist or it may require assistance from donors, Diaspora, etc. A weight of 10% was assigned because of the importance of this criterion, but also keeping in mind the subjective nature of its assessment.

- Linkages with other value chains for indirect benefits (5%). Linkages with suppliers outside the value chain and with others affected by the activities of the chain can add to total benefits by increasing the demand for their products, the availability of additional supplies of intermediate inputs, etc. The greater the linkages, the greater the potential indirect benefits. The relatively low weight was assigned because of the secondary nature of these benefits.
- Leverage (5%). Leverage effects show the degree to which EDMC assistance can leverage in additional resources from the private sector and other donors. The relatively low weight of 5% was assigned primarily because of the subjective nature of this assessment.
- Market access (10%). This is on the demand side to complement the capacity to overcome constraints on the supply side (see above). It refers to the existence of export markets and Armenia's ability to penetrate them by increasing its competitive advantage and market awareness. The weight of 10% corresponds to the weight assigned to the capacity to overcome supply constraints.

2.3.6 Prioritization of Value Chains

Points from 0 to 10 were assigned for each of the criteria to each VC by the EDMC Value Chain Team, meeting as a group. The only totally objective criterion was the DRC, with the number of points assigned so that 5 points were given for a DRC equal to one, 10 points for a DRC of zero, and 0 points for a DRC of 2 or greater. This was done to align the DRC column with the others for which a score of 5 was considered to be average. The weighted total of the criteria was then calculated and the VCs were ranked to yield the results shown in Table 2.

During the course of the exercise, several facts emerged. One was that breaking subsectors down into value chains was important for analytical purposes but was not functional for project implementations since it was operationally too restrictive. There are natural synergies between value chains, and project assistance needs to take these into account. This is especially important in high tech products and services. In other cases, fruits and vegetables being the most notable example, there is lots of overlap between different value chains. For example fresh fruits and vegetables are sorted, with the best fruit being exported fresh, the second quality sold fresh on the domestic market, and the third quality used in processing. Furthermore, most processors produce many fruit, vegetable, and juice products for which the costs cannot be isolated. For both these reasons, a number of value chains were grouped together in the final selection.

The enterprise survey showed that exports of legal, accounting, marketing, and enterprise development services were to a large extent simply contracts with international organizations, donors, and foreign-owned firms resident in Armenia rather than true exports outside Armenia. Furthermore, interest in these service providers is largely as conduits for assistance to other value chains. They are to be supported by the project to the extent that they provide that assistance, but not in their own right. Consequently, they were not considered here for direct assistance on their own.

Table 2: Points Allocated in the Prioritization of Value Chains

Subsector	VC #	Export Growth	Income Growth	DRC	Employment	Overcome Supply Constraint	Linkages effect	Leverage effect	Access to market	Total
Mobile and wireless applications Web applications	31,33	9	8	8	9	9	10	9	9	87
Pharmaceuticals herbs	13	8	8	9	9	7	8	8	8	84
CAD &CAE services	36	9	9	8	8	9	7	9	9	84
Mechatronics	37	9	9	7	8	9	7	9	9	81
Enterprise development	19	9	9	7	8	9	8	9	8	80
Fresh and processed fruits and vegetables	4-9	9	9	7	9	7	8	9	8	80
Computer graphics, multimedia, games	29-30	8	7	7	8	9	9	9	8	78
Classical, high income tourism	24	9	9	7	9	4	9	9	8	77
Testing & Measurement	38	8	8	7	8	8	8	9	8	77
Classical, middle income tourism	25	9	9	6	9	6	10	9	8	76
Parts of tel. sets, tel.	40	9	8	7	7	8	8	7	8	76
Development of microcircuits	34	9	9	7	8	5	6	5	9	74
Accounting & financial management	18	8	7	7	7	6	9	7	8	73
Brandy	10	8	8	7	7	5	8	6	9	72
Cheese and dairy	3	7	5	7	9	6	8	8	7	72
Enterprise software	27-28	7	7	7	7	8	10	8	6	72
Internet applications	32	6	6	7	7	8	8	8	6	69
Printed circuits	39	7	6	7	6	8	7	6	7	69
Legal, accounting, etc services	17	8	7	6	6	6	9	7	8	68
Embedded software and parallel systems	35	9	8	6	6	5	5	5	9	67
Pharmaceuticals generic	12	7	7	7	5	6	6	6	6	64
Marketing services	20	7	8	5	6	8	7	8	7	64
Rural tourism	26	7	7	5	6	6	9	8	7	62
Wine	11	6	5	6	7	4	6	5	7	60
Fish and crustaceans	1-2	7	6	8	2	6	3	3	4	58
Articles of jewelry and parts	23	6	5	6	5	6	4	5	5	56
Diamonds, not mounted or set	22	6	6	7	3	3	2	3	6	53
High-end fashion	14	6	6	4	5	6	6	5	6	51
Middle-end garments	15	5	6	4	6	4	5	5	6	49
Worked monumental/bldg stone	16	7	6	2	6	4	5	5	7	46
Bottled water	21	7	6	0	5	5	5	5	6	37
Weight		15%	5%	35%	15%	10%	5%	5%	10%	

2.3.7 Initial Selection

The value chains initially selected on the basis of their ranking in the prioritization and subsequent grouping are as follows:

- Wireless and Web Solutions and Computer Graphics
 - Mobile, wireless, and Web applications
 - Computer graphics, multimedia, games
- Engineering: Computer-Aided Engineering and Mechatronics
 - CAD and CAE services
 - Mechatronics
 - Testing and measurement
- Processed Fruits, Vegetables, and Herbs
 - Processed fruits
 - Processed vegetables
 - Fruit juices
 - Herbal products
- Integrated local tourism

A second list of VCs that stood high in the rankings was also presented. This list comprised

- Engineering Products
 - Parts of telephone sets and telephones for cellular networks
 - Printed circuits
- Enterprise Software and Internet Applications
- Pharmaceuticals (generic)
- Brandy
- Cheese and Dairy
- Embedded Software and Development of Microcircuits
- Fish and Crustaceans.

The only value chains that were ruled out for direct assistance were the following:

- Wine: The DRC is well below one, and exports have been rising rapidly, but much of the equipment is old and relies on manual processes. Furthermore, the climate is such that the amount of sugar in the grapes is barely adequate for table wine. More important, phylloxera is a major problem that will require uprooting most of the existing vines. This could take 20-40 years to eliminate!
- Jewelry: Jewelry experienced a sharp decline in exports after 2006. Most inputs are imported, limiting linkage effects. The DRC is well below one, but many skilled workers migrated to other countries during the recent economic crisis, endangering one reason for comparative advantage. Armenia's competitive advantage is being eroded by the poor quality of gold sometimes being used as gold prices have spiraled upwards.
- Diamonds: This is a highly specialized industry in which firms import uncut diamonds, cut them, and export un-mounted cut diamonds, resulting in very low linkage effects. There are also minimal employment effects. Despite low DRCs, exports have declined steeply since 2006 due to the world economic crisis. There have been constraints in the past on the supply of uncut diamonds.
- High-End Fashion: This value chain is largely a boutique activity, which is a hobby for many of the business owners. Slight comparative disadvantage is indicated by the DRC. It is difficult to compete in the international market with Turkey, and the domestic market is very limited. Inputs, which are not available in Armenia, are imported at high cost.
- Middle-End Garments: It is very difficult to compete with low-wage countries such as Bangladesh and India. DRC analyses indicate a comparative disadvantage. The value chain produces mostly substitutes for imports behind protective tariff walls. There is substantial female employment, but skills are becoming outdated. Most raw materials are imported. Transport cost for exports are high.
- Worked Monument/Building Stone: DRCs are well above one, indicating strong comparative disadvantage. The subsector is characterized by high costs for transport and imported inputs. There are high capital costs of equipment, which is not used very efficiently. Due to a limited local market, firms are not able to use by-products.
- Bottled Water: DRCs are very high, indicating strong comparative disadvantage. Capital costs and the cost of transporting exports are also very high. There is degradation of quality by some smaller producers.

In discussions with USAID, it was agreed to focus on a pilot basis on generic pharmaceuticals and bio-technology as a broad subsector with competitive potential and, in the case of generic pharmaceuticals, as unfinished business related to the CAPS project. In this regard a number of companies in the subsector received assistance to become certified for Good Manufacturing Practices (GMP) under CAPS, but they still require some additional help to attain that certification.

Another reason for looking “outside the box” is to try to maximize diversification in the selection of VCs for assistance; and not rely too much on the VCs that have already received quite a bit of assistance -- if not from USAID, then from other donors. For that reason, during the initial period of implementation, EDMC will explore opportunities in biotechnology to see if these can be added to the initial portfolio.

2.3.8 Final Selection of Value Chains

The final selection of Value Chains provisionally approved by USAID consists of:

- **High Tech:**

This sector will include a variety of VCs, initially subdivided into five general categories:

- **Mobile and Wireless applications** - Software development for smart phones, tablets, and wireless devices; including next generation technologies: bio-informatics, cloud computing, global information systems, large scale knowledge bases, etc.;
- **Computer graphics and Visualization** - 3D modeling/design, multimedia and computer games;
- **Embedded systems and EDA** - Design of printed and integrated circuits, electronic design automation, embedded software for electronics and parallel computing;
- **Web and Internet applications** - Web design and development, including such telematic services as e-commerce, distance education, telemedicine, etc.;
- **Engineering design and services** - Computer-aided design (CAD) and computer-aided engineering (CAE), mechatronics, testing, measurement and R&D, with the possibility to eventually grow out into engineering products.

- **Hospitality:**

EDMC will be considering targeted interventions, to include a combination of rural and cultural tourism, and with a special focus on developing the concept of service provision.

- **Food Processing:**

This subsector includes processed fruits and vegetables, juices, and herbal products. It also includes, as part of the value chain, production and marketing of fresh fruits and vegetables.

- **Pharmaceuticals/Biotechnology:**

EDMC will start activities in the sector of generic pharmaceuticals. The role that the project can play in aiding biotechnology and its links to pharmaceuticals will be expeditiously researched and clarified and a pilot pharmaceuticals application support initiatives will be identified and launched.

In addition, EDMC will help build service delivery capacity in the Business Development Services (BDS) sphere with a number of activities to improve/enhance their performance and with a particular focus on enabling greater specialization and more market-relevant impact in service provision (e.g., accounting/finance, quality standards, marketing...). Part of this will be accomplished by engaging BDS companies on a competitive basis in providing assistance to the core subsectors and VCs.

Aggregated Value Chain Summary/SWOT/PNA Analysis Sheets for each of these value chain groups are presented in Annex E.

3. Conclusions

The selection process involved in recommending the four value chain groups for assistance under the EDMC project was an objective analysis of a very wide range of alternatives using both qualitative and quantitative approaches. The decomposition of subsectors into explicit value chains permitted the use of sharp instruments of DRC, SWOT, PNA, and other analyses for ranking of alternatives, with subsequent regrouping for purposes of project implementation. In the end, the final selection was realistic and flexible based on criteria that had been previously established as the project's objectives.

In sum, there is a clear set of primary activities for the EDMC project that have been identified for follow-up work over the near to medium term. What EDMC will now focus on intensively is the formulation of a series of detailed VC work plans that will guide this work over the next year.

Annex A: Export Subsectors and Their Disposition

Code	Product label	Included?	Rational for Exclusion	Avg exported value ('000) 06-10
0103, 0104, 0106	Live animals, ex poultry	No	Lots of variability over time, no sophistication	984
0202, 0203, 0204, 0209, 0210	Meat of animals, ex poultry	No	Declining exports and basically an import substitution market	675
0301, 0302, 0303, 0304, 0305, 1604	Fish, live, fresh, frozen, preserved, incl caviar	Yes		1,191
0306, 1605	Crustaceans,	Yes		4,074
0406, 0401, 0402, 0403, 0404, 0405	Cheese and curd, other dairy products	Yes		1,451
0603, 0701 - 0711`	Fresh and frozen flowers and vegetables	Yes		635
0806	Grapes, fresh or dried	Yes		1,744
0809	Apricots, cherries, peaches, nectarines, plums & sloes, fresh	Yes		2,130
0901, 0902	Coffee and tea	No	Declining exports, roasting primarily for domestic market	10,976
1601, 1602	Sausages and other prepared meats	No	Largely an import substitute	1,246
0712, 0713, 2001 -- 2009	Dried, prepared, and preserved fruits and vegetables, juices	Yes		9,553
2201, 2202	Mineral & aerated waters, Non-alcoholic beverages (excl. water, fruit or vegetable juices and mi	Yes		1,876
2203	Beer made from malt	No	Flat export growth; mainly import substitute	1,065
2204, 2206	Wine of fresh grapes, Fermented	Yes		2,403

	beverages, nes			
2208	Spirits, liqueurs, other spirit beverages, alcoholic preparations	Yes		99,501
2512	Siliceous fossil meal & similar siliceous earths	No	Low regional and linkage effects	997
2523	Cements, Portland, aluminous, slag, super sulfate & similar hydraulic	No	Sharp decline in exports	20,583
2711	Petroleum gases	No	Re-exports	5,789
2716	Electrical energy	No	High concentration, few SMEs	11,254
2815	Hydroxide, sodium (caustic soda)&caustic potash; peroxide of sodium & pot	No	Highly concentrated subsector and very erratic exports	921
2825	Hydrazine & hydroxylamine & their inorganic salts; other inorganic bas	No	Highly concentrated subsector and very eratic exports	541
2849	Carbides, whether or not chemically defined	No	Highly concentrated subsector and very eratic exports	1,158
3004	Medicament mixtures (not 3002, 3005, 3006), put in dosage	Yes		3,352
3905, 3907	Polymers of vinyl acetate/o vinyl esters vinyl polymer primary forms, Polyacetate, polyether, epoxide resin, polycarbonate, etc., in primary form	No	Import substitution. Only 3 firms	757
3917	Tubes, pipes & hoses & fittings therefor of plastics	No	Flat export growth; mainly import substitute	626
3923	Plastic packing goods or closures stoppers, lids, caps, closures	No	Picked as an input to value chains	3,103
4002	Synthetic rubber &factice from oil	No	Highly vulnerable to world market; declining exports	14,978
4205	Articles of leather or composition leather	No	Picked up as input into footwear	563
4503	Articles of natural cork	No	Exports went to zero in 2010	796

4819	Packing containers, of paper, paperboard, cellulose wadding, webs	No	Import substitution, declining export trend	718
4821	Paper or paperboard labels of all kinds	No	Import substitution, declining export trend	1,011
5407	Woven fabrics of synth. filam yarn (incl. hd no 54.04)	No	Declining exports, primarily import substitute	803
5514	Woven fab of syn stapl fib (> 85% of such fiber), mx'd with cotton	No	Erratic exports, 0 in 2010	608
5601	Wadding of tex mat&art thereof;tex fib</=5mm le(flock)	No	Low and variable exports, limited data availability	592
5701	Carpets and other textile floor covering knotted	No	Drastic fall in exports due high labor costs and appreciation of the AMD	913
6006	Fabrics, knitted or crocheted, of a width of > 30 cm (excl. warp knit fabrics)	No	Exports crashed in 2010. Only 1 SME	830
6107, 6108	Men's underpants pajamas, bathrobes etc., knit/croch, Women's slips, panties, pajamas, bathrobes etc., knitted/crocheted	Yes		2,617
6203	Men's suits, jackets, trousers etc & shorts	No	Primarily import substitute	589
6212	Brassieres, girdles, corsets, braces, suspenders etc. & parts	No	Exports declining	11,545
6403	Footwear, upper of leather	Yes		713
6802	Worked monumental/building stone & art; mosaic cube, granules	Yes		3,229
7010	Carboy, bottle & other container of glass	No	Import substitute	10,992
7102, 7103, 7108	Diamonds, not mounted or set, Precious & semi-precious stone. Gold unwrought or in semi-manu forms	Yes		110,648
7113	Articles of jewelry & parts thereof	Yes		21,711
7305	Tubes & pipes, ext diam	No	Only one firm in subsector;	1,167

	>406.4mm,of iron &steel		declining exports	
'7311	Containers for compressed or liquefied gas, of iron or steel	No	Import substitution until last year	673
8406	Steam turbines and other vapor turbines	No	Only one year of exports	1,700
8413, 8414	Pumps for liquids; liquid elevators, Air, vacuum pumps; hoods incorp a fan	No	Erratic exports, import substitute	2,717
8462, 8464, 8468	Machine-tool for wrkg met by forging/hammering, etc., Machine-tool for working stone/ceramic, Mach & app for soldering, brazing (o/t those of hd 85.15)	No	Steady decline in imports	3,455
8481	Tap, cock, valve for pipe ,tank for the like, incl pressure reducing valve	No	Limited exports, basically an import substitution industry	525
8501, 8504	Electric motors and generators (excluding generating sets), Electric transformer, static converter (for example rectifiers)	No	Decline of exports	1,263
8515, 8517	Electric, laser/photon beam/plasma arc solderg with cut capabilities, etc, Electric app for line telephony, incl curr line system	No	erratic exports	1,540
8529	Part suitable for use solely/princ with televisions, recept app	No	erratic and declining exports	5,621
8534, 8535, 8536, 8537	Printed circuits, electrical app for switching (ex fuse,switche,etc) exceeding 1000 volt, Electrical app for switchg (ex fuse,switche,etc) not exceed 1000 volt, Board & panels, equipped with two/more switches, fuses	Yes		4,066
8606	Railway or tramway goods vans & wagons, not self-propelled	No	Low exports except 2009. One firm. Low employment.	1,401
8802	Aircraft, (helicopter, airplanes) &	No	Low and declining exports	635

	spacecraft (satellites)			
9001	Optical fiber, cables; sheets & plate of polarizing mat	Yes		757
9030, 9031	Oscilloscope/ spectrum analyzers; instr for measuring ionizing rad, Measuring or checking machines, nes	Yes		1,586
9101	Wrist- or pocket-watch, with case of prec/prec clad met	Yes		2,584
9111, 9113, 9114	Watch cases and parts thereof, Watch straps, watch bands and watch bracelets, and parts thereof, Other clock or watch parts	Yes		5,375
TOTAL GOODS	All products			975,122

Code	Service label			Average
225	-- -- Road transport - Freight	Yes	Low sophistication, regional, and linkage effects	43,793
242	-- -- Personal travel - Education related expenditure	No	Too complex	31,500
241	-- -- Health-related expenditure	No	Too complex	15,750
255	-- Freight insurance	No	No regional or linkage effects	10,178
250	-- Construction abroad	No	No regional or linkage effects	8,385
224	-- -- Road transport - Passenger	No	no regional or linkage effects	4,398
274	-- -- Legal, accounting, management and public relations services	Yes		4,325
288	-- Audio-visual and related services	Yes		3,408
889	-- -- News agency services	No	No regional or linkage effects, exports stagnant	2,553
278	-- -- Advertising, market research and public opinion polling	Yes		1,855

246	-- Postal and courier services	No	Exports stagnant	1,120
Subtotal				325,900

Tourism	Product			
	Classical	Yes		
	Adventure	Yes		
	Rural	Yes		
	Business	Yes		
Subtotal				

IT	Product			
	Customized software and outsourcing	Yes		
	Computer graphics, multimedia, and games	Yes		
	Internet and Web applications	Yes		
	Databases and MIS	Yes		
	Chip Design and electronic data automation (EDA)	Yes		
	Engineering services, systems engineering	Yes		
	R&D services	Yes		
	CAD & CAE, Industrial design, testing and measuring	Yes		
	Mobile Applications	Yes		
	Networking and security systems	Yes		
Subtotal				
Grand Total				

Annex B: Subsectors Chosen for Further Analysis

Weight		100%				33%			13%			13%			7%			13%		
Code	Product label	Selected	Rank	Average Exports	Growth Exports	Export potential	Rationale	Comparative Advantage	Rationale	Competitive Advantage	Rationale	Degree of Sophistication	Regional Impact	Linkages	Rationale	SMEs	SME Rank			
				000 USD	%			1 (low)-5		1 (low)-5		1 (low)-5	1 (low)-5	1 (low)-5		1 (low)-5	1 (low)-5	#	1 (low)-5	
Products																				
0301, 0302, 0303, 0304, 0305, 8004, 0306, 8005	Fish, live, fresh, frozen, preserved, incl caviar	Yes	3.5	5,265	-2.06%	4		3	Limited natural	4	Selling product in Europe	3	4	3	Relatively narrow, some linkages to feed industry		2			
0406, 0401, 0402, 0403, 0404, 0405	Cheese and curd, other dairy products	Yes	4.2	1,451	2.47%	4		4	Reasonable conditions, significant transport costs	4	Average technology, most companies not HACCP certified	4	5	3	Relatively narrow		5			
0603, 0701- 0711	Fresh and frozen vegetables, fruits, flowers	Yes	4.7	4,509	7.20%	5	Unlimited demand	5	Very good conditions, good taste	5	Can sell all products which are grown	3	5	3	Relatively narrow		5			
0712, 0713, 2001--2009	Dried, prepared, and preserved fruits and vegetables, juices	Yes	3.7	9,553	-5.65%	3	Slight decline over 4 years	4	Good raw materials, limited branding	3	Compliance and certification with food safety, quality management, supply problems, capacity problems	4	5	4			4			
2201	Water, mineral water	Yes	3.7	4,261	6.95%	4		4	Renowned medical water, high transport costs	4	Limited ISO and HACCP compliance	3	4	4		21	2			
2204	Wine of fresh grapes, Fermented beverages,	Yes	4.5	1,854	20.65%	5	Very strong demand	4	Wine growing regions are somewhat limited	4	Producers are doing relatively well	4	5	4	Bottles, cork, transportation, grape farmers		4			
2208	Spirits, liqueurs, other spirit beverages, alcoholic preparations	Yes	3.9	99,501	0.77%	4	Well established	5	History, geography, traditions	5	Huge industry	4	3	4	Bottles, cork, transportation, grape farmers		2			
3004	Medicament mixtures (Pharmaceuticals) (not 3002, 3005, 3006)	Yes	3.9	3,352	19.56%	5	Well organized, prospects are good	4	Cultural affinity with CIS markets	5		4	2	4	Chemicals, herbs		2			
6107, 6108	Men's underpants, etc., Women's panties, bathrobes, etc., knitted/crocheted		1.9	2,617	-48.55%	1	Dramatic export contraction	2	Labor costs are not lower than Bangladesh/China	2	Not competing well in market, no local brands	3	3	2	Mostly import materials	7	2			
6403	Footwear, upper of leather		3.0	713	40.05%	4	Shown recent growth, but there some problems	3	Have tradition and skills, but equipment old and high production cost, limited branding	3	Can sell to CIS countries, but not cost competitive with low cost producers	3	2	2	Mostly imported leather	28	2			
6802	Worked monumental/building stone&art.mosaic cube granules	Yes	4.1	3,229	8.19%	4	stable	4	High quality stone, but high transport costs	5	Seasonality, customs	4	4	3	High tech, engineering	88	4			
7102, 7103, 7108	Diamonds, not mounted or set, Precious & sem-precious stone/metal	Yes	3.4	110,648	-0.26%	4	Still have supply problems, but solving them	5	Strong skill base and tradition	4		5	1	2	Limited, some to high tech	10	2			
7113	Articles of jewelry&parts thereof		2.7	21,711	-25.09%	3	Significant recent drop in exports	4	Has gold mines, diamonds imported, traditional of gold masters, Armenia Diaspora support	3	Significant export drop indicates erosion of competitive advantage	3	1	2	Gold and diamond	19	2			
8534	Printing schemes (circuit printing)	Yes	3.8	397	33.43%	5	Strong overall growth, last two years flat	4	Copper is available, raw material is there; low transport costs	4	Strong demand for electronic industries	5	1	5	Strong links to electronics	7	2			
8535-8537	Electrical equipment		2.9	3,669	-0.58%	3		4	Copper mining, skills, medium value to weight	3	no export expansion	4	1	4			2			
9001	Optical fiber, cables; sheets&plate of polarizing mat	Yes	3.4	757	44.20%	5		4		4		5	1	1		3	1			
9030, 9031	Oscilloscope/ spectrum analyzers; instr for measuring ionizing rad, etc.		2.9	1,586	-3.07%	3	Strong growth in 07,08 but weakness in 09, 10	4	copper mining, skills, med value to wgt	3		5	1	3	Strong links to electronics	8	2			
9101, 9111, 9113, 9114	Wrist- or pocket-watch, with case of prec/prec clad met		3.1	7,959	1.93%	4		4	skills, new equipment	4	sell US, CIS, EU; well-trained management	4	1	2		4	1			
Services																				
225	Road transport - Freight		3.3	43,793	-6.99%	4		4	location	4		2	2	2		38	3			
274	Legal, accounting, management, public relations, advertising, etc. services	Yes	5.0	6,180	11.48%	5		5	strong education base,	5	certification programs exist	5	5	5		180	5			
288	Audio-visual and related services		3.3	3,408	5.55%	4		4	varying climatic	3	local actors, crew, but obsolete equipment, poor skills	3	2	2			3			
Tourism																				
	Classical	Yes	4.5			5	Strong demand	4	Weak infrastructure, strong attractions	4	Lack of sufficient of branding; established	3	4	5	Hotel, restaurants, IT		5			
	Rural	Yes	3.8			3	Fairly new	4	Weak infrastructure, strong attractions	3	Lack of sufficient of branding; fairly new	3	5	5	Hotel, restaurants, IT, Agro		5			
IT and Engineering																				
	Enterprise software	Yes	3.7			4	Some growth, but not exceptional	4	zero transport, basic skills, Diaspora	4	need for training	5	3	4	Supports financial services sector	10	2			
	Computer graphics, multimedia, and games	Yes	3.5			4	Some growth, but not exceptional	4	zero transport, basic skills, Diaspora	4	need for training, IPR	5	2	4	Related to visual arts, education	13	2			
	Mobile and web applications	Yes	4.3			5	Mobile technologies are booming today; easy to create new products; limited historical growth	4	zero transport, basic skills, Diaspora	5	Good, but training needs to be done; sensitive to IPR, Nokia/MS R&D center being established	5	3	5	Used in every sphere	45	3			
	Chip design, electronic data automation, testing	Yes	4.3			5	New companies entering, one company planning 100% growth in 2 years.	5	zero transport, advanced skills, Diaspora	5	need for training, Synopsis	5	4	5	High tech sector, precision engineering, electronics	4	1			
	Precision engineering services (CAD, robotics, mechatronics, testing & measuring)	Yes	4.3			5	Cutting edge technology	5	established IT and engineering	4	Need training (laboratory equipment)	5	3	5	IT, Electronics, Water	70	3			

Annex C: Enterprise Survey Questionnaires

**USAID Enterprise Development and Market Competitiveness (EDMC) Project
Domestic Resource Cost Survey
Processed Fruits and Vegetables**

Food processing private company questionnaire #

Date:

1. Company overview

- 1.1. Company name _____
- 1.2. Company address _____
- 1.3. Company tel. _____
- 1.4. Company email _____
- 1.5. Director/Owner name _____
- 1.6. Name of interviewer _____
- 1.7. Date of founding _____
- 1.8. Number of employees _____/women / youth under 25 years old
- 1.9. Capacity used in 2010 _____%

2. Production

2.1 Type of main products and volume of production for Y2010

Type of product	Quantity jars/kg	%
Marinade		
Mix		
Preserves		
Jams		
Juices	Quantity liters	

2.2 What are your most important problems in production?

3. Supply of raw materials

3.1. Source of produce/fruits and vegetables/ farmers _____/own
supply _____/other

3.2. Source of other raw materials
local _____/imported _____

3.3 Volume of raw materials purchased in 2010

Type	Unit	Total quantity	Cost AMD/USD
------	------	----------------	--------------

Fruits			
Vegetables			
Jars			
Other			

3.4 What are your most important problems in buying raw materials?

4. Operational costs for selected products for Y2010

4.1 Labor costs

	Nr Employees	Months Employed/Year	Monthly Salary AMD	Monthly Benefits AMD	Total Cost AMD
Managers					
Skilled workers					
Permanent semi-skilled & unskilled workers					
Seasonal workers					

4.2 Other costs

Item	Cost AMD	%
Rent		
Transportation		
<i>Utility</i>		
Electricity		
Gas		
Water		
Sewerage		
Other		
<i>Administrative</i>		
Office and supply		
Telephone		
Other		
<i>Taxes</i>		
VAT		

Other		
<i>Interest payments</i>		
<i>Other</i>		

5. Sales for Y2010

5.1. Where do you sell your products? Local market _____%
Export _____%

5.2. If exported, to which countries?

5.3. _____
Sales volumes and markets

Product	Buyer	Market	Value of sales AMD/USD

5.4. What competitive advantage does your production have in export market?

- a. Quality
- b. Price
- c. Packaging
- d. Branding
- e. Timeliness of delivery
- f. Customer service
- g. Food safety certification
- h. Other

5.5. What are the most important problems that you have in selling or marketing your product?

5.6. What kind of assistance can be provided to increase export sales?

6. Capacity and equipment

6.1. What buildings do you own for processing, packing, storage, etc?

Type of building	Capacity	Year constructed	Original cost AMD	Replacement cost today AMD/USD

6.2. What Types of equipment do you own for processing, packing, storage, etc?

Type of equipment	Capacity	Year installed	Original cost AMD	Replacement cost today AMD/USD

6.3. Do you plan to produce any new products? _____

If YES, please specify what kind of product and for which market?

Product type	Market

6.4. How many months out of the year were you able to operate? _____ months

6.5. What percentage of capacity do you use during your busiest months?

Months _____ Capacity, % _____

7. Value added tax

7.1 Did you pay a value added tax on your sales to the local market? _____
what % _____

When you paid this VAT, were you able to deduct the VAT paid on purchased inputs?

7.2 Did you pay a VAT on export sales? _____ If not, were you able to deduct the VAT paid on purchased inputs by _____

- a. Not paying the VAT on these inputs in the first place (temporary admission)
- b. Receiving a credit for the VAT previously paid on purchased inputs after you export
- c. Receiving cash reimbursement for the VAT previously paid on purchased inputs after you export
- d. Were you satisfied with the way these transactions were handled, and , if not, why not?

8. Finance

8.1. Loans and borrowing

Type of fin. product	Name of Institution	Amount AMD	Term	Interest rate	Fees/co mmission	Collateral

8.2. If not, why not? Please describe

Do not require additional finance	
Cost of these products is too high	
Cannot meet the requirements	
Products I need are not offered	
Other	

8.3. Does your business receive financing from your customers? If YES, on what terms?

8.4 Does your business provide financing to your suppliers? If YES, on what terms?

9. Development obstacles and needs

9.1. What are the main Business Environment Obstacles that you face?

9.2 What do you estimate your physical loss rate to be because of spoilage, damage, or other reasons?

9.3 Does company hold any of these certificates?

ISO HAACP FDA GMP GOST HAST Other

9.4 Are there any of these certificates that you would like to get in order to enter new markets and, if so, which certificates and markets?

What prevents you from getting these certificates?

9.5 Do your accounting, inventory control, traceability and other management information systems currently meet your needs?

If not, what would you like to improve?

- i. Accounting
- ii. Inventory control
- iii. Personnel management
- iv. Other (specify)

9.6 What factors limit sales increase?

9.7 Please evaluate your company's capacity according to the following indicators

a. Technology

- 1) There is limited technology available, which allows for producing few/1-4/ types of products of an average quality and a limited quantity
- 2) Sufficient technology available, which allows for producing major products /5-10 types/ to meet the demand, consistent quality and required quantity
- 3) The company has advanced technology, which allows for producing any types of canned products, with the high quality and desired quantity

b. Production capacity

- 1) Equipment is outdated or in poor condition and replacement is required.

- 2) Equipment and production lines are old, but still operational. Production capacity is sufficient for current operations. There is a need for modernizing the equipment and/or replacement of some parts.
 - 3) Equipment is relatively new, which allows for employing modern technology. Production capacity is adequate for the present demand and can be increased if required. The company operates according to international food standards or very close to these standards.
- c. Human resources /production/
- 1) The company has a limited number of production specialists, partially meeting production demand.
 - 2) The company has enough specialists to satisfy current production needs. In order to increase production more specialists need to be hired.
 - 3) The company has a sufficient number of specialists, who entirely satisfy the present demand. Production can be increased in short time without involving additional specialists.
- d. Production facilities
- 1) Production facilities are in poor condition, limiting the efficiency of the whole operation. Renovation is required.
 - 2) Production facilities are sufficient. Partial renovation will ensure further development.
 - 3) Production facilities are in good condition and meet international standards.
- e. Food safety and quality control
- 1) Quality control is performed occasionally, due to the lack of laboratory facilities and specialists.
 - 2) Quality control is performed regularly. The company has a functioning laboratory and specialists, although an overall quality control system is not in place .
 - 3) The company performs regular quality control, has a functioning quality control system /ISO, HAACP/ and operates according to international standards.
- f. Additional financing
- 1) Lack of working capital, difficult to attract additional funds from external sources.
 - 2) The company has sufficient working capital to ensure operation, but for capital investment financial resources are required. The additional funds for capital investment can be attracted, but the amount is likely to be limited.
 - 3) The financial situation is stable and additional funds can be attracted without limitation.
- g. Financial management
- 1) The company doesn't have any financial management system installed. Decisions are made by the owner.

- 2) The company has a financial management system installed and attempts to perform financial planning functions. Problems arise frequently due to the inefficient financial planning.
- 3) The company has a proper financial management system installed, including specialists. Efficient financial management and planning are performed.

h. Management

- 1) The company doesn't have a management system and all decisions are made by the owner.
- 2) The company has a weak management system. Some operations are performed by assigned managers, but for taking actions the owner's decision is required.
- 3) The company has an efficient management system and all decisions are made by the assigned managers.

i. Sales in the local market

- 1) The company doesn't have a distribution system, relationship with sales points is weak. Sales are very limited.
- 2) The company doesn't have a distribution system, sporadic relationship with sales points. Production is sold in a few markets.
- 3) The company has its own distribution system and specialized vehicles. Sales are carried out throughout the country.

j. Export

- 1) The company does not export production.
- 2) Production is exported to one country, relationship with buyers is weak, and the volume of exports is limited.
- 3) Production is exported to a number of countries. Products and the company are well represented in retail chains. Sales volume is significant.

k. Strategy development plan

- 1) No plan
- 2) Short-term/6 m - 1 year/
- 3) Long term /1-3 years/

10. What kind of assistance would the Company would like to receive? In which areas?

**USAID Enterprise Development and Market Competitiveness (EDMC) Project
Domestic Resource Cost Survey
IT Sector**

1. Name of Firm	<input type="text"/>	2. Name of Marz	<input type="text"/>
3. Name of village or town	<input type="text"/>	4. Telephone number	<input type="text"/>
5. E-mail	<input type="text"/>	6. Name of Interviewer	<input type="text"/>
7. Date (date/month/year)	<input type="text"/>	8. Data apply to the year	<input type="text" value="2010"/>

Qualitative Section

9. When was your firm established?

10. What were the products that you produced last year?

Product	Product	Product
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

11. What are the most important problems that you have in developing your product?

12. What are the major markets for your products ?

What are the most important problems that you have in selling or marketing your product?

13. What are the most important ways in which you could be helped?

14. Would you like to expand your business and sell more? In Armenia? For export?

If for export, which countries?

a. What prevents you from selling more?

b. Is franchising a possibility/option for your firm?

14. Would you like to expand your business and sell more? In Armenia? For export?

If for export, which countries?

a. What prevents you from selling more?

b. Is franchising a possibility/option for your firm?

i. If yes, in what markets?

ii. If no, what prevents you for franchising?

c. Who provides you with export marketing expertise, inside or outside your firm?

d. In the export markets where you sell or are trying to sell, what are the main ways in which you can gain a competitive edge?

i. Better quality product? ii. Branding iii. Networking abroad

iv. Lower price? v. added value vi. Other

e. In the exports markets where you sell or are trying to sell, are there product standard certifications that are required and from whom can you get those certifications?

Individual Certification

Company Certification

i. IBM

i. CMMI

ii. Intel

ii. IT Mark

iii. Microsoft

iii. ISO

iv. HP (specify)

iv. Other (specify)

v. PMP

v. Other (specify)

vi. Other (specify)

f. If you cannot currently meet the standards requirements, how much would it cost you to meet that those standards

15. Describe the following aspects of your business:

i. Skill mix of labor force

i. Skill mix of management

iii. Ability to obtain product-specific certification to sell in foreign market

iv. Other

16. Do your accounting and management information systems currently meet your needs?

If not, what would you like to improve? i. Accounting? ii. Personnel management

iii. HR management Project management Other (specify)

17. Do you currently have a written business plan? If not, would you like help in preparing one?

18. Are you currently using any of the following:

a. If yes, which are you using? Please describe.

	Amount	Term	Interest Rate	Fees	Collateral
i. Loans	<input type="text"/>				
	<input type="text"/>				
	<input type="text"/>				
ii. Leasing	<input type="text"/>				
	<input type="text"/>				
	<input type="text"/>				
iii. Insurance	<input type="text"/>				
iv. Letters of credit	<input type="text"/>				
v. Current bank account	<input type="text"/>				

b. If not, why not? Please describe

- i. Do not need them for my business
- ii. Cost of these products is too high
- iii. Cannot meet the requirements
- iv. Products I need are not offered
- v. No financial institution near me

c. Which financial institutions are you getting these financial products from

	Name	Location
i. Bank	<input type="text"/>	<input type="text"/>
Bank	<input type="text"/>	<input type="text"/>
ii. UCO	<input type="text"/>	<input type="text"/>
UCO	<input type="text"/>	<input type="text"/>
iii. Other	<input type="text"/>	<input type="text"/>
Other	<input type="text"/>	<input type="text"/>

d. Do you need additional financial products for your business that your financial institution is not offering? Which?

e. Does your business receive financing from your customers? If yes, on what terms?

f. Does your business provide financing to your suppliers? If yes, on what terms?

Quantitative Section

19. What quantity and value of sales did you have last year? Products (specify)	Product	Unit of Quantity	Total Quantity	Total Sales Value
1. Designed chip, Electronic Data Automation, testing, etc.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
2. Enterprise software (accounting, banking, financial etc)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
3. Mobile and web applications	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
4. Computer graphics, multimedia, and games	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
5. Customized software and outsourcing	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
6. Networking systems and communication	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
7. Databases and MIS	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
8. IT services and consulting	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
9. Other (specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
10. Other (specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD

b. What is the % or number of women in your work force? % #

c. What is the % or number of employees under 25 in your work force? % #

d. What is the % or number of your annual labor turnover? % #

25. What are your annual variable costs?

Type of Variable cost	Type of Var. Cost	Unit of Quantity	Unit Cost	Total Quantity
1. Temporary labor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
2. Input costs	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
3. Office supplies	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
4. VAT	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
5. Other (specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
6. Other (specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
7. Other (specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
8. Other (specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
9. Other (specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
10. Other (specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> AMD

26. What were your R&D costs last year?

Describe R&D	Cost
<input type="text"/>	<input type="text"/> AMD
<input type="text"/>	<input type="text"/> AMD
<input type="text"/>	<input type="text"/> AMD

27. What is your company's IPR policy?

a. Are there any registered IPs

Type	Name/brief description	Year
1. Copyrights	<input type="text"/>	<input type="text"/>
2. Trademarks	<input type="text"/>	<input type="text"/>
3. Industrial design	<input type="text"/>	<input type="text"/>
4. Other (specify)	<input type="text"/>	<input type="text"/>

b. What were your total costs for IP protection last year?

Domestic Market	International Market
<input type="text"/> AMD	<input type="text"/> AMD

28. Under what brand do you market your products?

Own Brand	International Brand
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

29. Did you pay a value added tax, and, if so, how much per value of sale? %

30. If you paid value added tax (VAT), did you deduct the VAT paid on purchased inputs?

31. If you exported your product, were you able to avoid paying VAT and customs duty on your purchased inputs?

If you exported your product, were you reimbursed for VAT and customs duty paid on imported inputs?

32. Do the products you produce have transport cost? If yes, what is the cost?

Delivery Location Cost

Annex D: Sample DRC Analysis Sheet

Annex E: Aggregated Value Chain Summary/SWOT/PNA Analysis Sheets

In aggregating across the individual VC Summary Sheets, totals and averages were calculated, where possible, using the data in the individual sheets. In other cases, such as hospitality services, only very approximate data were available for the industry as a whole. In still others, such as high tech, some data were available by value chain and other data were only available for broad aggregates of value chains. This was the case, for example, with data on exports. Every effort was made to provide as comprehensive set of estimates as was possible given the gaps in the data.

The Aggregated Value Chain Summary Sheets were compiled at the end of the selection process. They reflect, therefore, what had been learned during that process and not just what was known at the time the original summary sheets were prepared.

High Tech

Structure of the Value Chain

- There are about 250 companies of varying sizes in this sector. Most of the companies are SMEs, averaging 25 employees per firm.
- There is a diverse export market, with most established markets in Russia, CIS, EU, and North America.
- Net profit margins as a percentage of sales fluctuate widely, ranging from 19% to 57%. Industry components with the highest profit margins (as a percentage of sales) include CAD, CAE, Web Applications, and Engineering Services.

Quantitative indications:

- Exports averaged 9.4 million USD annually during 2006-09.
- Annual growth of exports during 2006-09 was 15.5 % per annum.
- Sales in 2010 were 114 million USD.
- Employment in 2010 was around 6,000.

DRC indicators:

- Financial profitability as a percentage of sales averaged 31%, with a range of 9% to 57%.
- Value added as a percentage of total cost in economic prices averaged 89%, with a range of 76% to 97%.
- DRCs averaged 0.57, with a range of 0.36 to 0.78.

Comparative advantage or disadvantage

Strengths:

- Thanks to Armenia's historical role as a major technology center in the former Soviet Union, there exists an infrastructure and educated workforce with technical skills.
- With over 5 million Armenian Diaspora around the world—and particularly in Russia, Europe, and North America— there is the potential for Diaspora assistance with collaborations, marketing, sales, internships, scholarships, etc.
- Armenia is culturally and geographical close to Russia and other CIS, giving the country an advantage in targeting this region.
- The number of private universities involved in IT and engineering education is increasing.
- Armenia is regarded by foreign IT firms as an attractive investment and project development destination, as evidenced by the large proportion of foreign or jointly owned companies in the country.

Weaknesses:

- Most of the existing university laboratories and R&D centres lack critical modern equipment to train workforce with the relevant technical know-how.
- It appears that the skills of the workforce are increasingly becoming unaligned with the needs of the industry.
- There is a weak presence of an "Armenian Brand" in the international market.

Competitive advantage or disadvantage

Strengths:

- Entrepreneurial spirit is high, which makes Armenia stand out in the region.
- The Diaspora provides strong business support, which brings in needed investment and opens new markets that would otherwise be challenging to access.

- There is already an established and effective policy dialogue between the private sector and GOA.
- The country has a relatively competitive export policy (e.g. tax-free exports).

Weaknesses:

- One of the major weaknesses is that local firms have little knowledge of or experience in marketing, sales, and business development in foreign countries.
- Management skills are low, with the weakness particularly pronounced among local companies.
- Quality of the workforce does not meet the needs of the industry, with most firms having to undertake substantial training of new employees.
- The low quality of the workforce has led to a fickle labor market with high turnover.
- Enforcement and protection of IPRs are weak.
- Existing tax/customs and regulatory policies appear to be insufficient.

Potential for Growth (Opportunities)

- Global market trends are favorable to the high tech sector.
- Donor agencies (mainly World Bank) are working on upgrading the country's national high-speed broadband. Since weak ICT infrastructure and unreliable internet connection are some of the main issues that all the surveyed firms complained about, such an upgrade should significantly improve the industry's future growth.

Major Constraints (Threats)

- Existing laboratories and R&D centres do not have the capacity to produce the right workforce with the relevant technical and management skills.
- There is an increasing misalignment of skill and specialization of existing workforce and the needs of the industry.
- Local firms that do not have foreign parent companies have inadequate expertise in marketing and sales.
- The existing marketing and distribution channels are underdeveloped.
- External financing, a critical component of developing new businesses, is missing. There is generally low access to capital as most banks and financial institutions are not willing to lend to small start-up companies.
- The public sector, and especially public universities, lack financial and other incentives for developing basic, but critical, R&D and innovations.
- Local companies are isolated from the technical innovations, processes, and methods that other similar industries in the EU and US are developing.
- There is an insufficient presence of incubators, technoparks, and economic zones that are especially designed for SMEs.

EDMC areas of potential assistance

The EDMC Project could:

- Partner with other donors and contribute to upgrading the laboratories used by the Polytechnic Institute and other technical universities.
- Run week-long marketing classes and week-long sales classes focused on the specific products and markets of attendees. Attending should be marketing and/or sales personnel from High Tech companies as well as BDS providers who want to consult to High Tech companies on marketing and sales

- Teach BDS providers the basics for High Tech startups including evaluating the market, testing product concept, creating a marketing program, planning and writing a business plan including detailed financial projections (Profit & Loss, Balance Sheet, Cash Flow Analysis) for 3 years, raising early stage capital, applying for grants, getting up-front payments from customers, etc.
- Provide training focused on developing internal communication, management, team building skills, etc. in larger Armenia-based companies with 25+ employees.
- Strengthen professional associations and unions supporting the technology sector. Working with an association, union, or NGO, the EDMC Project could create an internet clearing house to match the needs of Armenia-based High Tech companies with members of the Diaspora who would like to assist High Tech companies. In addition, the Project could assist with publicizing the site to the Diaspora and local firms.
- Work with banks to create loan products to meet the need for working capital and loans to purchase licensed software. Perhaps the product would include aspects of micro-lending with a group of small High Tech companies joining a financing cluster to guarantee each other's loans.
- Strengthen the BDSs supporting the technology sector.
- Support the ability of smaller firms to attend international trade fairs and events, with the aim of helping them develop networks.

Summary: High Tech has the potential to become a key engine of knowledge-based economic growth in Armenia. The critical constraints are the marketing and sales expertise of local firms, market access, and technical skill/sophistication of the workforce.

Hospitality Services

Structure of the Value Chain

- The total number of firms is over 2000, comprising hotels, B&Bs, restaurants, transport companies, tour operators, and travel agencies.
- Middle-income tourists, comprising the vast majority, are mainly from France, Germany, USA, and Russia. Especially important are:
 - Those who sign up for packaged tours in advance, and
 - Those who come on their own and may sign up for local tours after they arrive.
- High-income tourists come primarily for business and may engage in a day or two of tourism in addition.
- Rural tourism is currently in its infancy.
- Net profit margins as a percentage of sales fluctuate in the range of 12% to 27% for hotels, 40% to 54% for restaurants, and 29% to 32% for tour operators. They are slightly negative for transporters.

Quantitative indications:

- Average exports for 2006-09 were valued at 403 million AMD.
- Annual growth of exports during 2006-09 was 20-23% per annum.
- Employment in the hospitality services sector today is approximately 19,500, or 1.7% of the total workforce.

DRC indicators:

- Financial profitability as a percentage of sales averages about 11% and varies from 8% to 14%
- Value added as a percentage of total cost in economic prices averages about 90% and varies from 72% to 92%.
- The DRC averages about 0.83 and varies from 0.80 to 0.85.

Comparative advantage or disadvantage

Strengths:

- Armenia is the first Christian nation.
- It has a unique cultural heritage and traditions that are still practiced by the people.
- Many medieval monasteries, churches, and fortresses are found in Armenia.
- It has six UNESCO World Heritage sites.
- Armenia has a number of pre-historic sites.
- Spectacular scenery characterizes some areas in Armenia.
- Armenia's people are creative, warm and generous.
- There is a large variety of activities that could be developed around attractions that already exist.
- Armenia has a large Diaspora, which loves the country and has money to travel.

Weaknesses:

- Roads are in poor condition.
- Little English is spoken outside of Yerevan.
- It is expensive to get to Armenia, and expensive to stay in Yerevan and Lake Sevan.
- It takes a day or more to get to Armenia from many locations and another day to return, which is a long time and increases jet-lag. There are few non-stop flights and only from a few cities.

- Armenia lacks obvious attractions other than monasteries, museums, and landscape. Yerevan nightlife is similar to nightlife in other big cities.

Competitive advantage or disadvantage

Strengths:

- A large number of NGOs, the World Bank, and other organizations are interested in tourism. Diaspora individuals and groups are committed to and working on projects to improve the tourists' options and experience. Progress over the past five years continues today.
- Lots of potential exists with local Armenians who are stakeholders with experience in all aspects of tourism and who want to grow and improve their businesses. There are a large number of individuals and SMEs in this sector, i.e. 130 tour companies in Yerevan. Opportunities exist for entrepreneurs in small towns who want to develop a tourism-related business.

Weaknesses:

- Except at high-end establishments, the standard of service and facilities is significantly below the standard expected by the international traveler. There is a scarcity of clean "modern" toilets in rural areas and even in Yerevan.
- Successive tours of monasteries and the like become monotonous. There is little variety in things to do and see.
- It is difficult to plan a visit. There are many websites, but none are comprehensive enough to answer all the questions and connect to the appropriate facilities, activities, etc.
- There is a lack of experienced and skilled hospitality-related personnel.
- There is a shortage of hotels, B&Bs, restaurants, sanitary facilities, crafts shops, nightlife, and activities outside of Yerevan.
- Food and lodging providers in small towns suffer from erratic electrical service, and lack of sufficient refrigeration, modern appliances, updated bathrooms, and air conditioning. They also suffer from not being able to communicate with foreigners because they do not speak English, the travel language even for travelers whose first language is not English.
- There is a lack of proper maintenance of unique buildings and monuments, which have high cultural and historical value.
- There is a lack of bank products or micro-lending designed for the financial needs of SMEs in tourism outside Yerevan.
- Political and economic power resides in the hands of a few in rural areas, which can hinder or help development of small towns to be attractive to tourists.

Potential for Growth (Opportunities)

- Internationally, tourism is a rapidly growing sector.
- Tourists are seeking culturally unique and active locations. They want to get off the beaten path.
- Armenia has a strong potential for integrated tourism in rural areas involving visits to monasteries and monuments, staying in local B&Bs, eating local traditional cuisine, and participating in village life involving discussions, music, and dance with villagers.
- There is some potential for hiking and soft adventure, especially if linked with other tourism activities.

Major Constraints (Threats)

- Tourists generally have a poor experience in rural areas due to the lack of decent accommodations, restaurants, sanitary facilities and the excessive time spent traveling because of this. They find it monotonous to visit a large number of monasteries and

monuments, often in a run-down condition. As a result, there is poor dissemination of opportunities by word of mouth and on internet blogs.

- There is an absence of mechanisms for promoting public-private partnerships at the local level among churches, monastery staff, villagers, banks, and potential investors for the purpose of developing and coordinating local plans for upgrading accommodations, restaurants, meeting places, sanitary facilities, gift shops, cultural events, language interpretation, and other means to heighten the experience of tourists in rural areas.
- Armenia lacks a good centralized website, which could be used by tourists to locate hotels, restaurants, tour operators, cultural events, fairs and festivals, and other places and events of interest.
- There is an absence of coordination mechanisms between governmental bodies, NGOs, Diaspora, and stakeholders in the private tourism sector that could leverage efforts and improve results.
- Very high prices characterize the airline transportation sector.
- There is an absence of professional hospitality, marketing, and sales staff.
- Levels of taxation are high.

EDMC areas of potential assistance

The EDMC project could:

- Assist in organizing and supporting public-private partnerships at the local level for the purpose of upgrading the rural tourist experience and environment;
- Provide assistance for the development of a comprehensive, engaging tourist website that comes up as the top listing when tourism-related words and Armenia are Googled, that is engaging with lots of activities, sights and weekly events causing viewer to want to stay longer in Armenia, and that is easy to use when the future tourist wants to book a room, hire a guide or tour company, rent a car, etc.;
- Assist lending institutions, banks, credit associations, and microfinance institutions in creating appropriate products for individuals and SMEs in the tourism sector. Assist in making these products known to those individuals and SMEs who need them. Assist with the application and compliance process;
- Work with GOA to decrease the high price of air fares by allowing and encouraging foreign (European and Asian) airlines to include Yerevan in their route schedules;
- Work with GOA to commit to the improvement of roads to sites, the building and maintaining of modern, clean toilets at sites, and the maintenance/upkeep of sites;
- Assist in the training of hospitality managers and staff located outside of Yerevan. Bring to Yerevan hospitality professors from the West to upgrade and expand the course offerings at the local hospitality schools. These trainings have to be a few weeks to a few months in length. Three-day workshops are not long enough to improve hospitality service attitudes, knowledge, pride, and behaviors;
- Review the taxation of businesses in the tourist sector and determine whether there are ways to reduce their tax burden;
- Help to develop and implement a marketing program focused on the Diaspora in the U.S. and Europe, working with foreign tour operators and using Diaspora churches, schools and cultural organizations as the vehicle to encourage travel to Armenia. At the present time, showcasing Armenia in foreign trade shows is expensive relative to the revenue it generates. This type of promotion should be postponed for a couple of years to allow time for the expansion of tourist options, improvement of the tourist experience, and creation of a comprehensive, interactive website that will encourage longer visits and make planning and booking of travel easy. This is low cost promotion, and the Diaspora is likely to be less demanding in their requirements than other foreign tourists;

- Do a feasibility study with cost benefit analysis on assisting residents with the development of their small town/large village as a “model” that could be replicated by other villages. The study should cover at least two large villages located near popular tourist sites in northern Armenia. The goal would be to remedy some of the major complaints of tourists and tour operators and generate income for residents of the town/village.

Summary: There is a great potential for tourism in Armenia but developing it depends vitally on substantially improving and expanding the tourist experience so visitors will tell the world about beautiful, charming, fascinating, fun, and culturally rich Armenia.

Processed Foods

Structure of the Value Chain

- There are estimated 45-50 producers of canned products, compared with 7 such firms ten years ago. Seven to eight firms today are newly equipped.
- The stages of the food processing chain are: production on farm, collection and transportation to processors, processing, storage, and transport to market.
- Armenia exports to Russia, Ukraine, Georgia, Turkmenistan, Belarus, the USA, and the EU.
- Links with other value chains include: strong linkages to suppliers of fresh fruits and vegetables (30 big farmers), producers of packing materials, cold storage, and cooperatives.

Quantitative indicators

- Exports averaged 9.6 million USD per year during 2006-2010.
- Annual growth of exports during 2006-10 was -5.56%.
- Growth of exports was slowed by the severe impact of drought on the tomato crop in 2009 and 2010.
- Imports in 2010 were 9.5 million USD, or about the same value as exports.
- Sales of processed foods in 2010 amounted to 24.2 million USD.
- Annual production equals about 135,000 MT of grapes and 33,300 MT of fresh fruits and vegetables.
- Employment in 2010 was equal to 1,130 workers, of which 70% were female; there is additional seasonal employment.

DRC indicators

- Financial profitability as percentage of sales averaged 23.7%.
- Value added/total cost in economic prices averaged 60.7%.
- The DRC for processed food averaged 0.63.

Comparative advantage or disadvantage

Strengths:

- During the Soviet era, Armenia was a primary supplier of agro-processed goods for the entire USSR. A stagnant heritage of old buildings and outdated machinery remains, located mostly in areas of production. Newer plants are being set up closer to Yerevan, where there is better access to inputs and markets.
- Armenia has good soils and climate suitable for a range of fruit, vegetables and herbs.

Weaknesses

- Transportation costs to Russia and other major markets are high.
- Sales in Europe and the USA are focused on Armenian shops, with increasing attention to "Middle Eastern" branding, which underscores the need to compete with Turkey, Lebanon, etc.

Competitive advantage or disadvantage

Strengths:

- Each producer has its own team of wholesale buyers, which start their business in March - April, when they conclude preliminary verbal agreements with farmers and sometimes provide them with fertilizers and pesticides and learn about new farmers that have begun to grow a particular culture. Processors encourage setting up rural households groups (consisting of 5-7 farmers) and hire agricultural experts to offer advisory services. This is

done to ensure that at the end of the season, farmers supply processors with high quality raw material. Every major processor has agents in all regions of Armenia, which provide them with necessary information concerning product availability, yield, prices, and other data. They also organize the purchase of agricultural products during the season, its transportation to the processor, etc.

- Agricultural processing companies have launched long-term contractual relationships with rural communities and farmers. This ensures that farmers and communities face stable markets for sale of their products and provides an opportunity for proper production planning, which has led to a steady increase of production volumes.
- During the last 5-6 years, extensive training in technology, food safety, management, marketing, finance, etc. has been provided by specialists to all major processors.
- Food processing in Armenia is characterized by high quality and low price. In some cases, the quality is actually superior to what is demanded on the local, or even Russian/CIS, market. This results in processor wanting to penetrate markets in Europe or the US.
- The importance of branding is recognized and successfully implemented in a number of cases.
- CIS countries and Armenian Diaspora are main consumers, where Armenian branding constitutes an advantage.
- Exporters are usually able to offset payment of VAT on imported inputs against VAT owed on local sales, so as not to depend on reimbursement.

Weaknesses:

- Armenian food processors have not been able to break out of the “Armenian” market for exports in order to compete more effectively with other Middle Eastern producers.
- There are severe problems in getting FDA certification for the US market.

Potential for Growth (Opportunities)

- Capacity utilization varies widely from 10% to 60% depending mostly on the availability of produce, sales markets, and working capital. If these constraints could be eased, there would be ample room for expansion.
- Armenian producers have good access to Russian and other CIS markets, with an excellent reputation.
- Exports to the US and the EU enable producers to get higher prices for their products, but they are inhibited by higher transport costs and lack of certification. The latter is also likely to be increasingly important even for Russia and the other CIS markets.
- Both branded juice and juice concentrate sell well in Russia and CIS. Concentrate is recombined with water and other juices by companies that are affiliated with established international brands.

Major constraints (Threats)

- Certification is a constraint for exporters. For exports to the EU, processors need HACCP or ISO22000 certification, but only 6% of Armenian firms possess such certification. There are no facilities in Armenia for advanced testing, and only very limited facilities for testing to meet recently imposed FDA requirements.
- A key constraint on getting HACCP or ISO22000 certification is the high cost of required equipment modifications and necessary reconstruction of facilities.
- There is a lack of short-term storage (7-30 days) for purchased fruits and vegetables. This leads to high variability of produce prices depending on the season. There is a strong need for greater storage capacity.
- There is a need for improved packing for high quality fruit and vegetable products to be sold in premium export markets.

- The supply of produce to processors is characterized by inconsistent quality and late arrival.
- Losses for fresh produce can reach 30%.
- There is a lot of outdated equipment and a need for new technology.
- There are frequent delays in produce delivery due to transport bottlenecks, especially in high season.
- There is a need for working capital advances to farmers until they sell and get paid for their products.
- There is a need to improve accounting, inventory control, and management systems.
- Lack of aggressive marketing characterizes the food processing subsector.

EDMC areas of potential assistance

The EDMC project could:

- Support establishment of a multi-functional cold storage capacity to handle surpluses at harvest time and to even out the flow of produce through the processing stage;
- Investigate potential gains from improved packing of high quality fruits and vegetables for premium export markets;
- Assist with brand identification and market contacts;
- Provide support for introducing new technologies;
- Provide support for certification;
- Provide support for accounting, inventory control, and personnel management;
- Assist in export financing, e.g., letters of credit;
- Explore the potential for expanding organic fresh and processed fruits, vegetables, and herbs (e.g., herb tea) as a way of competing in new markets where there is stiff competition from neighboring countries;
- Assist with the formation, administration, and financing of farmer cooperatives, including enabling legislation to provide legal structures for same.

Summary: This is a large and diverse sector in which there is much that EDMC can do. An important task will be to coordinate with other donors to divide up tasks.

Pharmaceuticals/Biotechnology

Structure of the Value Chain

- This group of value chains is made up of 21 companies; 7 are exporting firms of which 4 are of medium size (70 employees) and 3 are small (28 employees).
- The stages of the value chain comprise the following: 3 companies own facilities which fully meet GMP standards, 2 companies plan to build new factories and 2 companies are working towards GMP.
- The companies use transport companies for importing raw materials and exporting finished goods. This is not a major cost due to the nature of the product.
- Links with other value chains include: packing services, high tech companies, and BDS services.

Quantitative indicators

- Exports averaged 3.3 million USD during 2006-10.
- Annual growth of exports over 2006-10 was 1.75% per year.
- Total sales in 2010 were 26.4 million USD.
- Employment in 2010 was 500.

DRC indicators

- Financial profitability as percentage of sales averaged 21.6%.
- Value added as a percentage of total cost in economic prices averaged 74.2%.
- The average value of the DRC indicator was 0.650.

Comparative advantage or disadvantage

Strengths:

- Armenia has a long tradition in medicine making and collection of various herbs.
- The chemical industry has been a prominent part of the Armenian economy for many years. In the 1980's, approximately 10% of manufacturing output was generated by the chemical sector, which included pharmaceutical production.
- Raw materials are mainly imported, easy to transport, and not too high in price. Most raw materials and chemical compounds used in production are available from EU and US suppliers.
- Armenia has the advantage of a relatively low-cost work force.
- Exports of pharmaceuticals, though concentrated mostly in the CIS market, are nevertheless reasonably diversified.
- Barriers to entry for new companies are low.
- The Scientific Center of Drug and Medical Technology Enterprise, with its state-of-the-art laboratory equipment, assures appropriate testing of both inputs and outputs of the pharmaceutical industry.

Weaknesses:

- Best practices of competitors are not in the creation of new medicine, but in introducing new generic combinations, food supplements, and natural products. Armenia is not fully committed to this path.
- Development of new drugs is expensive even with the best technology, but Armenia lacks new technology and know-how in research.

Competitive advantage or disadvantage

Strengths:

- Four hundred of about 3900 drugs registered in Armenia are produced locally and have an 8-10% share in the local market. This serves as a base for exports.
- Pharmaceuticals is an already developed sector with profitable firms willing to cooperate with each other for attaining higher profit. The Medicine Producers and Importers Union includes 13 importers and producers and engages in lobbying.
- A GMP center of excellence was created with support from CAPS and offers some GMP and other courses related to quality standards in the pharmaceutical area.

Weaknesses:

- Exports are hindered by companies that still do not have GMP certification.
- Absent is a local body that can provide national GMP certification.
- Strategic development goals are limited; they do not target long-term improvement of R&D.
- Two large local importers hinder the expansion of market share in the domestic market.
- The major procurement source in the local market is the government, and this channel is already defined and corrupted.
- There is a negative perception of local consumers towards local production.
- Requirements set by pharmaceutical companies for input supply by local biotechnology and fine chemicals firms are not always met. For example, some pharmaceutical companies have acquired GMP certification, which requires that the suppliers of the company should also have GMP standards.
- Technologies and laboratory equipment of biotechnology and fine chemicals firms are obsolete.
- Due to these issues, the inputs that can be supplied by biotechnology and fine chemicals industries are more expensive than imported inputs.
- Armenian firms are weak on developing new marketing and promotion of new technologies.

Potential for Growth (Opportunities)

- Pharmaceuticals, together with biotech and including health/vitamin/ herbal/additives, offers a high growth market, but one which is highly competitive.
- VC's potential for growth depends on technological renewal of the production process in most of the enterprises, as well as GMP accreditation. Once this is achieved, the potential for expansion of exports into new markets will be great.
- Large FDI investments are planned in the sector, which will provide an opportunity for increasing the productivity of the sector by introducing innovative approaches and investing in R&D.
- Opportunities exist for the production of new Armenian brands of generic drugs based on drugs with expiring patents.

Major constraints: (Threats)

- The GMP certification process is slow and expensive, limiting markets.
- Some companies lack technical knowledge required for certification.
- Old and obsolete equipment in some companies must be replaced to meet GMP standards.
- Armenia lacks a national GMP certification agency with international standing. A law has been passed to establish such an agency, but it needs to be implemented.
- There is severe competition from international brands in the domestic market.
- The domestic market is oligarchic in nature with 2 dominant importers and distributors.
- There are some internal management needs (accounting, inventory control, personnel management, financial planning, network link between office and production).
- There is a need for marketing advice and contacts in Russia and the EU.
- There are financial needs for renewal and expansion.

- The subsector lacks qualified specialists.

EDMC areas of potential assistance

The EDMC project could:

- Provide technical assistance for GMP certification;
- Assist implementation of legislation to establish a national GMP certification authority;
- Develop new financial products suited to the industry's need for fixed capital investment and growth of working capital;
- Provide assistance regarding internal management needs (accounting, inventory control, personnel management, financial planning);
- Assist in entering new markets once GMP certification is achieved.

Summary: This is a relatively mature but still developing industry with strong potential. It has received important assistance from the USAID-funded CAPS project in the past, but there is unfinished business. In addition, the EDMC project needs to explore the area of biotechnology, its links with the pharmaceuticals industry, and how it can be assisted.

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