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# EVALUATION OF THE SUN MICROSYSTEMS GDA PROJECT

## USAID/ARMENIA

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## **DISCLAIMER**

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## Acronyms

AOPC	Sun Technologies Based Armenian Open Programming Competition
ArmStat	Armenian Statistical Service
CAPS	Competitive Armenia Private Sectors
EIF	Enterprise Incubator Foundation
GITC	Gyumri Information Technologies Center
ILT	Instructor Led Training
R&D	Research and Development
RAU	Russian-Armenian (Slavonic) University
SDC	Solution Development Center
SEUA	State Engineering University of Armenia
USAID	United States Agency for International Development
YSU	Yerevan State University

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## **Executive Summary**

The Sun Microsystems GDA project was successful in achieving its goals of increasing the sophistication of the IT sector in Armenia. As a consequence of its support of educational institutions and collaboration with the private sector, it was possible to prepare students with the knowledge and skills that are necessary to bridge the gap between their academic foundation and the realities of the marketplace. As a result, graduates of the participating universities were able to obtain internships with local firms that invariably led to full time employment.

The laboratories and testing facilities created under the project provided an environment whereby new and existing IT firms could test new applications without incurring the prohibitive expense of investing in the high-end hardware and software that would be required to conduct these experiments.

Also, the incubators supported by the project provided the opportunity for young entrepreneurs to create new companies and invent new technologies that have applications not only for the domestic market but also with significant export potential.

### **I. Description of the Project**

United States Agency for International Development (USAID), the Enterprise Incubator Foundation (EIF), and Sun Microsystems Inc. have jointly implemented a project aimed at tackling the chronic shortage of qualified IT employees and the low added value that has characterized Armenian IT businesses. The objective of the project was to strengthen the skills of university graduates and introduce high productivity services to the Armenian IT sector.

In cooperation with major Armenian private firms and universities, the project focused on upgrading educational infrastructures, creating advanced Research and Development (R&D) labs and facilities for software testing and integration. The total budget for the program was \$1,510,636, of which USAID contributed \$750,000.

Key objectives of the program included student training and development emphasizing the acquisition of technical expertise that is consistent with industry standards, implementation of new courses covering advanced technologies employed at Sun Microsystems and other leading high-tech corporations, and establishment of modern research, development, integration, and testing facilities with competent teams capable of providing complex services to local and international clients. No less important was the task to ensure that the program and its components would be sustainable after the initial funding is exhausted and that it would remain fully operational and capable of growth in the long run, all the while providing significant value to the program partners and Armenian IT industry.

The Program had two components, each concentrating on one of the industry needs:

1. Training laboratories to offer up-to-date courses covering technologies demanded by industry.
2. Solution development, integration, and testing centers to promote new product development and R&D.

## **II. Evaluation Purpose and Methodology**

The purpose of the evaluation was to obtain a comprehensive and balanced overview of project activities and results for the purpose of helping USAID plan its activities for any future interventions in these designated sectors.

To accomplish this, the evaluation team met with the main stakeholders of the program, such as university labs coordinators and Sun Solution Development Center representatives, as well as with entrepreneurs at newly-formed spin-off companies. In addition, meetings were scheduled with a diversity of stakeholders for the Sun Microsystems GDA project and tours were arranged to visit the various laboratories, server farms and incubators created under the auspices of this joint effort.

## **III. Findings**

In line with key objectives of the program, several major components program were implemented:

**Sun Training Labs –training component:** Within the overall scope of the project, the training component included the following principal activities as published in the EIF’s Project Completion Report.

- Establishment of Sun Training Laboratories in Armenian educational institutions
- Organization of Sun-related short courses for IT professionals
- Promotion of Sun technologies at Armenian universities
- Organization of Sun-related contests for young professionals

As a result of the project, four Sun Training Labs were established at:

- Yerevan State University (YSU)
- State Engineering University of Armenia (SEUA)
- Russian-Armenian (Slavonic) University (RAU), and
- Gyumri Information Technologies Center (GITC).

A special 6-month Optional Course Program was developed to be taught at the labs, including the following major subjects:

- Java programming
- Object-Oriented Programming
- Web technologies
- Databases

In total, 185 students were trained. At GITC’s Lab, 40 students completed courses on Sun’s technologies in 2008 and 2009.

**Sun Academic Initiative:** To secure access to Sun's latest technologies, participating universities were assisted to enroll in the Sun Academic Initiative, one of the programs Sun offers to further its collaborative relationship with educational institutions. As a result of joining the program, State Engineering University of Armenia, Yerevan State University and Russian Armenian (Slavonic) University received opportunities to enjoy:

- Free access to an extensive portfolio of Web-based courses through the Sun Learning Connection
- Free Web-based access to Instructor Led Training (ILT) courseware
- Free Web-based ePractice Certification Exams
- Discounts for Certification Exams

**Short-Term Courses:** The pilot short-term training courses were implemented within the project scope to provide opportunities for existing professionals to improve their skills. Under this initiative, two short-term courses on the Linux operating system were conducted.

**Promotion of Sun technologies in Armenian Universities:** Sun-related technologies were further promoted through the introduction of the Sun Campus Ambassadors program which, in collaboration with Sun Training Labs and the Sun Academic Initiative, aims to build communities around Sun's free and open source platforms (OpenSolaris, Open SPARC and Java) and also promote developer tools among academic developers, such as students, faculty and researchers. As a result, two Sun Campus Ambassadors at the Russian-Armenian (Slavonic) University and the American University of Armenia were contracted in October 2008 to promote Sun's open-source technologies in a student environment, including OpenSolaris, Java, Netbeans, and Sun Studio.

**Sun Technologies Based Armenian Open Programming Competition (AOPC):** AOPC is an annual programming contest aimed at challenging the skills of young IT professionals up to age 30 in Armenia. AOPC has been in place since 2003. Within the project scope, the 5th Armenian Open Programming Competition (AOPC) was dedicated to Sun Technologies. In total, 116 people applied to participate in the contest. A Winners Award Ceremony was held on December 16, 2008. Along with the main awards for the 3 best individual and group participants, special prizes were given to the best female participant and participant who provided the best Java solution.

**Solution Development Center (SDC):** The Center was created with the intention of providing Armenian companies with integration and testing services, as well as offering a hosting platform for software solutions developed in Armenia. The Center's secondary key task was to focus on research and development activities that are currently not pursued by Armenian software firms due to the high risk associated with such projects. It was also envisaged that the Center's team would register a legal entity and continue on its own after the program ends.

The SDC promotes start-up ventures and seeks out new clients through participation in industry functions and events and networking with contacts developed at these forums, which are a good source for insider information about what is going on in the business.

The long-term sustainability of the SDC will be dependent upon its ability to solicit new business and secure contracts that will provide the necessary cash flow to cover its operating expenses. Given the Center's reputation and the fact that its services are valued by its clients, its medium-term sustainability should be assured. However, at some point in the future, it will be necessary to upgrade the Center's hardware and software, and this will represent a significant outlay. At present, there are plans to formulate a second Sun project for submission to USAID that provides for upgrading hardware and software and expanding the scope of the SDC's services.

EIF's Final Report to USAID on Project Implementation describes the following SDC activities:

**SDC Projects:**

- The SDC team has been collaborating with Matenadaran, Armenia's state repository of ancient manuscripts, on the digitization and archival of ancient texts and books. Software solutions and hardware options are researched, and Sun's experience in library and archival solutions are reviewed and applied. Program partner Aviainfotel currently works on the development of a specialized search engine that will be used to index and search archived and digitized manuscripts.
- The SDC team is involved in the design and development of an e-education platform architecture. Sun's experience in implementing electronic and online educational systems in Spain and Mexico serve as models for this project. In addition, the team conducts research on the possible implementation of e-tax services in Armenia fashioned after Sun's experience in Ukraine. The project focuses primarily on the hardware aspects of e-tax services implementation. The team is currently working on the business model analysis for the purpose of designing key processes and their subsequent implementation.
- Several internet service providers are currently using Sun's lab hardware for testing various hosting services. In addition, several companies are testing their new products on the Sun servers. This includes Sourcio, which runs its web monitoring services Monitorus (<http://mon.itor.us/>).
- The SDC team conducted an analysis and review of a new programming language called Caper (dynamic Compliant, Asynchronous, Parallel Events Routines): Caper's capabilities were evaluated in terms of resource use intensity and behavior when running 200,000 parallel processes. Subsequently, there was a review and testing of applications developed with Caper, including a graphics editing program.
- The team has been reviewing long-term opportunities for Sun's software labs taking into consideration the latest developments at Sun Microsystems and in the worldwide IT industry in general. This analysis will allow the team to design a concept for the further development of new projects.

- The team is working on a Web Mail system to address an issue prevalent with many email systems in Armenia: the web mail systems hang or the session times out when very a large number of emails (tens of thousands) is available in the inbox or an email folder. The new system will use a special algorithm in order to show the email folder with such large number of messages in proper time without timeouts.
- The SDC team is working on a special software program called eSpeech that will be used by logopedists to help Armenian children with speech disorders. The team built the prototype and is currently testing it on the available equipment for bugs and remote access issues.

**IT Industry Statistics Tool:** A key component of the Sun project is the implementation of a web-based information system that will be used by Armenian IT companies to submit statistical data. The SDC, under the guidance of the Ministry of Economy and with the assistance of the Armenian Statistical Service (ArmStat), has developed an online tool than can be used to periodically collect basic key statistics from the Armenian IT sector. The participating companies use a web interface to fill out online surveys that include both data that firms have been providing to the ArmStat so far, as well as information that EIF has been gathering from the sector during its periodic surveys.

**Software Process Improvement Services:** The SDC provided CMMI-based software (Capability Maturity Model Integration) process improvement services to both local and global markets. An appropriate service package, marketing and sales plans have been developed. The three main components of the service package are: Awareness Workshop, Assessment/Benchmarking and SPI project setup and coaching.

#### **IV. Conclusions**

The Sun Microsystems GDA program has proven to be an effective vehicle for training students and providing them with a path to full time employment with local businesses.

- The main successes of the Sun Microsystems GDA project have been the effective collaboration with the Enterprise Incubator Foundation and the establishment of the four computer laboratories and an R&D testing laboratory. Many students have been able to receive internships with established companies which have led to full-time offers. Project officials stated that 70% of the 185 graduates of the Sun training program received immediate offers of full-time employment and the remaining graduates all found jobs within two or three months. The consultants were also told that in general, students with a straight mainstream IT education didn't fare as well on the job market because they were trained on obsolete platforms and their skills did not match current industry requirements.
- The incubators have spawned a number of promising start-ups that are already generating revenue and employment. In Yerevan, Develop Way CJSC employs about 10 people and there are four students doing internships there under the Competitive Armenia Private Sectors (CAPS) program. In June, three graduates of the Sun Slavonic University Lab

started a new venture. One of them was the winner of the Armenian Open Programming Contest, which was organized under the sponsorship of this project. Aside from themselves, the entrepreneurs employ freelancers on an intermittent basis. In Gyumri, graduates of the Sun Lab program at the Gyumri IT Center started a company that employs five people and a number of freelancers.

- The Sun Microsystems GDA program is teaching up-to-date skills that are relevant to current employment opportunities in the Armenian IT sector, especially Java and Linux, both of which are universally applicable throughout the industry, independent of corporate affiliations or brand identities.
- The program has gained considerable momentum since the time it was established and the training capacity and development of new curricula are both likely to be sustainable in the long run. However, it may be necessary to identify sources of financing for eventual hardware replacement and software upgrades in the future.
- According to the persons interviewed, there is balanced gender participation in the training and subsequent employment for participants in the Sun Microsystems GDA program. Female graduates found jobs in ways similar to their male colleagues. Although the consultants did not observe any instances of female entrepreneurs actually establishing new ventures, some may have found employment with firms started by their male counterparts.
- Universities, private IT businesses and students all expressed satisfaction with the Sun Microsystems program.
- The SDC's success was a consequence of its strategy to provide Armenian companies with unique, affordable integration and testing services, as well as serving as a hosting platform for software solutions developed locally in Armenia. Another key advantage was that it focused on research and development activities not pursued by Armenian software firms due the high risk associated with such projects. Armenia's attractiveness as a center for serious, sustainable state-of-the-art R&D is further evidenced by the very significant investment made by Synopsis in their Yerevan facility.
- The model is working as evidenced by the satisfaction of the stakeholders that use it. In Gyumri, students at the GITC Sun Lab were very enthusiastic about their training and their prospect for becoming entrepreneurs in the future. In Yerevan, the Develop Way startup incubated under the SDC succeeded in securing a contract from the National Statistical Service to develop a web-based information system that will be used by Armenian IT companies to submit statistical data to the government.
- The stakeholders interviewed by the evaluation team expressed satisfaction with the existing modalities used for training courses. A number of individuals expressed enthusiasm for the potential of e-learning courses delivered by video conferencing from remote locations overseas.

## **V. Recommendations**

- Utilize CAPS/Sun experience in building GDAs with more large companies in the future.
- Apply similar GDA models in other sectors and promote cross-sectoral GDAs (e.g. waste management, environment, etc with use of high-tech).
- Continue to provide resources and encouragement for young entrepreneurs who aspire to establish new firms using innovative, locally developed technologies.
- Consider extending the project keeping in mind the three previous recommendations.

## **VI. Lessons Learned**

The best practices for the implementation of Global Development Alliance projects in Armenia are very much dependent upon the nature of the undertaking. However, in general it can be pointed out that the presence of private (and especially transnational/multinational) companies provides more flexibility and potential sustainability after a major donor's phase-out.

Further, it is worth considering public-private partnerships with other global companies present today in the Armenian IT market to pick up the momentum and build upon the achievements of this program.

At the same time, the availability of short-term training courses as part of the scope of such program would increase the number of beneficiary students and provide more flexibility for training component management.

# **ANNEXES**

## **Annex 1: Documents Reviewed**

### **Sun Microsystems Documents**

SOW.doc  
EIF-Sun-USAID-Progress Report-Jan-Mar 2008  
EIF-Sun-USAID-Progress Report-Jan-Mar 2008-Annex  
EIF-Sun-USAID-Progress Report-Apr-Jun 2009  
EIF-Sun-USAID-Progress Report-Jul-Sep 2008  
EIF-Sun-USAID-Progress Report-Oct-Dec 2008  
EIF-Sun-USAID-Progress Report-Jan-Mar 2008  
EIF-Sun-USAID-Progress Report-Apr-Jun 2009  
EIF-Sun-USAID-Progress Report-Jul-Sep 2009  
Sun final Report - short

### **Other Documents**

Pharmaceutical Sector Development Council, Concept Paper 2009  
The Impact of Targeted Promotion of Armenia as a Tourism Destination to the Italian Travel Trade & Public  
Transparency International Global Corruption Barometer 2009  
U.S. Ambassador's Speech at the American University of Armenian 2010  
Global Integrity Scorecard Armenia 2007  
Establishment of Advanced Educational and Technology Resources in Armenia - USAID 2010

## Annex 2: List of Interviews

General Interviews – June 14 to June 24, 2010		
Name	Title	Organization
Jatinder Cheema, Ph.D	Mission Director	USAID
Timothy Alexander	Director, Program Office	USAID
Simon Sargsyan, Ph.D	Project Management Specialist, Economic Growth Office	USAID
Diana Avetyan	Economic Growth Office, Private-Sector Specialist	USAID
Dr. Marina Vardamyan	Office of Economic Growth, Energy, Water and Environmental Officer	USAID
Mariam Gevorgyan	Monitoring and Evaluation Specialist	USAID
Artak Ghazaryan	Director	CAPS
Armen Abrahamyan	IT Cluster Coordinator	CAPS
Lala Margaryants	Pharmaceutical Cluster Coordinator	CAPS
Gera Voskanyan	Tourism Cluster Coordinator	CAPS
Armen Shahbazyan	Business Associations Specialist	CAPS
Timothy Moore	Associate, Enterprise and Industry Development	Nathan Associates, Inc.
Sophia Muradyan	Senior Analyst	Enterprise Incubator Foundation (EIF)
Norayr Vardanyan	Project Manager	Sun Incubator Project
Hrayr Ter-Nikoghosyan	Project Manager	Sun Solution Lab
Vladimir Yeghiazaryan	Head of Applied Math in Informatics Department	Slavonic University (Russian-Armenian University)
Eduard Philiposyan	Sun Campus Ambassador	Russian Armenian University
Karen Vardanyan	Executive Director	Union of Information Technology Enterprises
Davit Sandukhchyan	Chief Legal Officer	Beeline
Andrew Hovhannisyan	Deputy General Manager	Synopsis
Gurgen Paronyan	Executive Director President	Gyumri IT Center 3-D Modeling Union
Davit Kocharyan	Executive Director	developWay CJSC
Davit Grigoryan	Director	Flexible Applications CJSC
Arman Atoyan	Founder, Creative Director	X-TECH
Sofi Baroyan	Director	Vericel Service
Emil Gabrielyan M.D.	Director President	Drug Agency Pharmacological Society of Armenia
Gevorg Yaghjyan, M.D., PhD	Vice-Rector	Yerevan State Medical University

Gevorg Safaryan	Director	LimeTech
Frans Stobbelaar	Pharmaceutical Expert	Pharin International
Robert Harutyunyan, PhD	Director-General	Armenian Development Agency
Mekhak Apresyan	Head of Tourism Department	Ministry of Economy
Pegor Papazian	Chief Executive Officer	Competitiveness Foundation of Armenia
Varooshan Harikian	Dean of Extension Programs	American University of Armenia
Hayk Chobanyan	Director	Ministry of Labor and Social Issues, "Nork" Information-Analytical Center
Alex Sardar	Country Team Representative	Counterpart
Karine Avetisyan	Head of Actuarial Mathematics Department	Yerevan State University, Sun Training Laboratory
Syuzanna Azoyan	Marketing Director	Competitive Foundation of Armenia, Armenian Tourism Development Agency (former)
Noubar Tatarian	President	Armenian Hotel Association
Amalia Stepanyan	Executive Director	Armenian Hotel Association
Yeghishe Tanashyan	President, Armenia Chapter, Managing Partner	American Society of Travel Agents Five Stars Travel
<b>Pharmaceutical Focus Group Participants – June 18, 2010</b>		
<b>Name</b>	<b>Title</b>	<b>Organization</b>
Vardan Mkrtchyan	Marketing and Sales Manager	Liqvor CJSC
Sona Khachatryan	Quality Assurance Manager	Esculap Ltd.
Shahe Kassis	Director	Medical Horizon
Gevorg Yaghjian, M.D., PhD	Vice-Rector	Yerevan State Medical University
Samuel Zakarian	Director	Medicine Producers and Importers Union of Armenia
Azam Ghazaryan	Director	GXP Center of Excellence
<b>Tourism Focus Group Participants – June 18, 2010</b>		
<b>Name</b>	<b>Title</b>	<b>Organization</b>
Naira Sukiasyan	President	AGG
Luisa Khalatyan		AGG
Varooshan Harikian	Dean of Extension Programs	American University of Armenia
Shushan Khachatryan		Fairyland Travel Agency
Amalia Stepanyan	Executive Director	Armenian Hotel Association
Yeghishe Tanashyan	President, Armenia Chapter, Managing Partner	American Society of Travel Agents Five Stars Travel

Mekhak Apresyan	Head of Tourism Department	Ministry of Economy
Lusine Martirosyan		Sima Tours
Hovhannes Morgovyan		Armenian travel Bureau
<b>IT Focus Group Participants – June 18, 2010</b>		
Name	Title	Organization
Hayk Chobanyan	Director	Ministry of Labor and Social Issues, "Nork" Information-Analytical Center
Arman Atoyan	Founder, Creative Director	X-TECH
Gevorg Safaryan	Director	LimeTech
Davit Kocharyan	Executive Director	developWay CJSC
Grigor Barseghyan	Country Manager	Microsoft
Sofi Baroyan	Director	Vericel Service
Davit Grigoryan	Director	Flexible Applications CJSC
Tatevik Sakradyan	Marketing Specialist	Flexible Applications CJSC