



1. Project Data

Project ID
P115647

Project Name
E-SOCIETY & INNOVATION

Country
Armenia

Practice Area(Lead)
Transport & ICT

L/C/TF Number(s)
IBRD-79630

Closing Date (Original)
31-Dec-2014

Total Project Cost (USD)
30,000,000.00

Bank Approval Date
30-Nov-2010

Closing Date (Actual)
30-Jun-2016

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	24,000,000.00	0.00
Revised Commitment	23,295,576.38	0.00
Actual	23,295,576.38	0.00

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2. Project Objectives and Components

a. Objectives

Project Portal Project Development Objective

The project development objective (PDO) for the ***E-Society and Innovation for Competitiveness Project (EICP)*** as stated in the Loan Agreement (IBRD-79630) was: “to address constraints to competitive e-Society and enterprise innovation in Armenia”.



b. Were the project objectives/key associated outcome targets revised during implementation?

No

c. Will a split evaluation be undertaken?

No

d. Components

The project had three components with costs and financing per component (ICR, Annex 1) as follows. (The differences in the numbers by component and figures in Annex 1 were attributed to the SDR changes).

Component 1. E-Society Infrastructure/enabling-environment Development (appraisal estimate US\$13.8 million; actual cost US\$4.48 million, reduced after 2014 restructuring).

This component focused on the following activities:

- a. **Activity 1.1 Deployment of national broadband information infrastructure to households** originally including backbone network, but after 2014 only focused on providing broadband access to 344 villages in rural regions. In 2014 the backbone activities were canceled because the private sector provided the backbone infrastructure, making the government investment in network towers and fiber optic cable redundant. Funds original designated for this component were then reallocated to component 2 restructured scope or work.
- b. **Activity 1.2 "Digital Citizen" Program**, including the creation of a national certification authority that issues electronic signatures to enhance trust and security in the provision of electronic services. The e-certificates were to promote businesses and citizens to further uptake electronic services.
- c. **Activity 1.3 "Computers for All" Program**, which sought to increase the literacy and use of computers by urban and rural population.

Component 2. Fostering Enterprise Innovation (appraisal estimate US\$11.09 million; actual cost US\$17.35 million, increased with funds from Component 1, activity 1.1 after the 2014 restructuring).

This component focused on funding and establishing financial mechanisms to facilitate innovation among knowledge and technology-driven companies. Activities included:

- a. **Activity 2.1 Grant programs for innovation in knowledge and technology-intensive firms** for product or process adaptation, improvement and development as well as seed money for the Venture Fund
- b. **Activity 2.2 Support to the physical establishment and operation of the Gyumri Technology Center (GTC)**. The center served as a firm incubator place and community center. It provided technological support and incubation services to local firms and entrepreneurs.
- c. **Activity 2.3 Support to the physical establishment of the Vanadzor Technology Center**, replicating the Gyumri model described above.
- d. **Activity 2.4 Assistance for the development of the IT/Knowledge-intensive industry in Armenia** supporting businesses' skills and technology development, firms' linkages with demanding international markets and Armenian research capabilities, including establishment of Silicon Valley Sales Force Representation Office.



Component 3. Project Management (appraisal estimate US\$0.96 million; actual cost US\$1.47 million)

The cost increased after the 2014 restructuring because of the increase in goods, services and operating expenses implicated by the creation of the Vanadzor Technology Center. Unlike other Bank projects that typically established a Project Implementation Unit, the EICP supported/supervised the project implementation through units within the Ministry of Finance (Foreign Financed Projects Management Center, FPPMC) and the Ministry of Economics (E-Governance Infrastructure Project Implementation Unit, EKENG). The component funded a combination of expenses for goods, consultants and operating costs of the Gyumri and Vanadzor Technology Centers (i.e. building refurbishing and subsidizing electricity, water, accounting, security, office equipment, legal and accounting activities, other operating expenses to have the centers running). The component also funded technical assistance, and capacity building. In addition, this component disbursed grants and for "seeding" the Venture Fund that were matched by private sector parties. The Bank financed 51% of the Venture Fund capital. This allowed the Bank to supervise procurement, set the regulations, procedures and agreements with the private sector parties that contributed to the Fund.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost: Based on Annex 1, the total project cost estimated at appraisal was US\$26.09 million but the actual cost was US\$27.3million.

Financing: The World Bank financial contribution was an IBRD loan of US\$20.87 million but actual disbursements were US\$23.3 million. The Japan Policy and Human Resources Development Fund contributed US\$0.97 million which was completely disbursed. Armenian private sector partners provided co-investments as parallel financing, matching the money provided by the Bank (ICR, Annex 1, footnotes 24 and 25). The project received co-financing as follows:

(a) E-society infrastructure development: Partners provided US\$2.19 million for Rural Wi-Fi and "Computer for All" Program (Rural WI FI US\$80,545 and "Computer for All" US\$2,105,263)

(b) Innovation enterprise development: The Bank provided funds and had various partners matched its funding with a total of US\$43.45 million contributions to finance the following activities: the establishment and funding for the Venture Fund (US\$25,947,782), money for the Innovation Matching Grants (US\$822,710), contributions to establish the Gyumri Technology Center (US\$1,5223,580) and the Vanadzor Technology Center (US\$256,884). Finally, three other private donors supported skills development activities (US\$14,898,884).

Borrower Contribution: The Government committed to contributing US\$6.0 million to the project at appraisal but disbursed only US\$4.01 million.

Dates: There were three project restructurings approved as noted below and an extension of the closing date by 18 months from December 31, 2014 to the final closing date of June 30, 2016.

Restructuring: The project had three restructurings. On September 2011, a reallocation of funds was authorized to cover the shortage in funding for the Gyumri Technology Center. On July 09, 2014 project activities were revised and realigned with new Government priorities, the reallocation of the proceeds of the project was approved to match changes in activities. During this second restructuring, the extension of closing date by 18 months was approved. Finally, on August 7, 2015 the eligibility of disbursements financed by the Loan Agreement for Venture Fund categories and activities descriptions were approved



as amended in the Loan Agreement.

3. Relevance of Objectives & Design

a. Relevance of Objectives

The project's PDO was highly relevant to World Bank's Country Partnership Strategy (CPS) for Armenia for 2009–2012, which is grounded in Armenia's Sustainable Development Program (ICR, para. 9). As the ICR observed: "Armenia's Development Strategy 2014–2025 continues to support the development of e-Society as part of its growth strategy. The Armenia Development Strategy clearly states that competitiveness and innovations are key to achieving the vision of transforming Armenia into a knowledge-based economy, and stresses the importance of ICT-based innovation that has been built upon the e-Society project" (ICR, para. 44).

The project was also relevant to addressing nine major challenges facing Armenia's e-Society and entrepreneurial innovation. On the supply side these challenges included (a) low level of Internet penetration; (b) major inequalities between urban and rural populations in access to modern Internet; (c) lack of coordination of ICT development efforts, (d) low level of PC penetration, (e) unaffordable prices for even low-end PCs, and (f) fast obsolescence of specialized skills and migration of young talent. On the demand side constraints facing e-Society and enterprise innovation development were (a) weak local entrepreneurship; (b) low access to credit and commercial investments, (c) lack of a qualified workforce, and (c) lack of adequate infrastructure for business incubation in the regions (PAD paras 16 to 25).

Rating

High

b. Relevance of Design

This Review found that EICP's proposed activities were substantially relevant to the project's development objective. For example, it was intended that the project would construct ICT broadband towers and premises for technology centers which would provide internet-access enabling tools such as PCs and e-certificates for secure electronic transactions. Other activities proposed included capacity building (including business and IT-use advisory services, training and technical assistance) to mainstream digitalization in urban (initially but later cancelled) and rural areas (introduced as a priority after the 2014 restructuring). Internet and PC penetration were necessary conditions for achieving the project's objective of addressing constraints facing an e-Society. Similarly, the funds, fiduciary guidelines, advisory services (for business incubation) and disbursement mechanisms that supported technology firms in testing or developing new, refined, or scaled-up products or processes were (ICR, paras. 51 to 59) key activities that fostered enterprise innovation. All in all, the project's activities effectively removed or reduced the constraints the project set out to address.

The results framework in the PAD lacked baseline benchmarks and targets. The ICR explained that baselines



and targets were subsequently determined by the financial management advisory firm KPMG. This firm assisted the Ministry of Economy with the preparation of baselines, performance indicators and semiannual updates of those indicators but it was not hired until October 2013, i.e., almost two years after the project's effectiveness.

Nevertheless, the original results framework also provided no basis for understanding causality links between inputs and outputs. The matrix did, however, record 4 PDO indicators and 16 intermediate outcome indicators which reflected targets for intermediate outcomes. These M&E indicators were updated after the 2014 restructuring. The changes in indicators were reflected in the March 2014 ISR. The ICR noted that the project's anticipated achievements were modified resulting in modification of the scope of intermediate outcome indicator #1 from "Residential broadband household penetration" to "Residential broadband household penetration in villages under the project". In addition, three other intermediate outcome indicators were dropped - mainly because attribution to the project could not be determined.

Unlike the assertion in the ICR that the EICP's design may have been too ambitious to generate changes in overall sector competitiveness, this Review concludes that the project design was relevant to addressing previously non-existent mechanisms without which improved competitiveness in e-Society and enterprise innovation would likely not have ensued.

Rating
Substantial

4. Achievement of Objectives (Efficacy)

Objective 1

Objective

As mentioned in Section 2a of this Review, the PDO is "to address constraints to competitive e-Society and enterprise innovation in Armenia."

For this Review, the PDO in the Loan Agreement was used to assess the achievements of this project, unpacked into two sub-objectives:

- 1(a) Address constraints to a competitive e-Society
- 1(b) Address constraints to enterprise innovation

Mainstreaming electronic transactions in e-Society and innovation was intended to enhance beneficiaries' skills and knowhow in ICT and entrepreneurship. It also meant creating from scratch or strengthening Government procedures/mechanisms to ensure internet secure use, refurbishing public buildings for use as technology centers, installing broadband devices in rural villages to enable Wi Fi access that fostered an e-Society, and establishing the enabling business environment to support ICT firms innovation.



The project's overarching objective of "addressing constraints to competitive e-Society and enterprise innovation." Although competitiveness was difficult to measure, this Review concluded that, as the ICR noted, that the EICP has played a catalytic role in developing the knowledge and technology-intensive industry, in supporting the mainstreaming of an e-Society, in fostering innovation and in increasing investor confidence in Armenia's innovative initiatives (ICR, para. 52a). The rationale for this conclusion is presented separately for competitive e-Society and innovation below.

Rationale

Objective 1(a): Addressing Constraints to Competitive e-Society

a.1 Outputs - the following summary of the project's outputs that contributed the achievement of this objective is based on information in Annex 2 of the ICR

The project provided public infrastructure, computers, credit and enhanced internet security services that enabled the achievement of an e-Society:

Public works investment

- Enhanced penetration of digitalization in businesses evidenced by:
- Development of Knowledge/Technology-intensive industries (Information Technology /Information Technology-enabled services - IT/ITES - sector revenue as a proportion of GDP) – target 2%, achieved 5%
- IT/ITES sector employment (number of people) – target 6,900, achieved 12,685. This Review notes that the second two indicators are proxies of enhanced relative importance of the IT sector performance in the economy, possibly suggesting IT mainstreaming. However, they cannot address the constraints to competitive e-Society and enterprise innovation as indicated in the ICR.

IT Penetration via support to households and businesses

- Increased access to internet services (% population using Internet) – target 50%, achieved 73%
 - Households received Wi-Fi access in the targeted 344 remote rural villages
 - Residential rural household broadband penetration – Target 30% of households, achieved 41%
 - A few cases observed of older population in the villages are using skype in rural areas, promoting family links
 - The ICR does not provide data on the number of people using internet that are attributable to the project, by gender, urban/rural disaggregation. However, since most of the men in Gyumri migrate on a short or long term basis to Russia as workers, most of the immediate beneficiaries were women.

Credits disbursed through the "Computer for All" Program facilitated PC purchases among the population

- The "Computer for All" Program gave credits for PCs/ITC devices to 37,171 people– exceeding target of 15,000
 - Of these, an implementing partner identified that half of loans signed under the program were signed



by a female member from the household in 11 regions of Armenia (ICR, para. 64).

Enhancing a secure enabling environment for e-Society penetration

- The "Digital Citizen" Program established the Certification Authority to ensure secure internet use, which would stimulate mainstreaming digitalization:
 - 5,000 e-IDs certificates targeted – 1,022,262 e-ID certificates issued – extremely exceeding target. This meant that nearly one-third of the population are equipped to engage in e-transactions.
 - "...exogenous factors such as rapid growth in ICTs globally ... and the introduction of 3G/4G capacity ... made ICT services more accessible at lower costs" (para. 59).

a.2 Outcomes

The EICP contributed significantly to fostering e-Society. Specifically the project supported the following achievements.

- Internet available in 344 remote rural villages
- Government strengthened procedures/mechanisms to ensure Internet security, by establishing a Certification Authority that has issued more than 1 million user ID certificates, i.e., one third of Armenia's population by project closure
- Loans have been to beneficiaries so they could buy computers at lower prices following the project's fostering of competition which eliminated the operations of a monopoly seller.
- Beneficiaries' skills and knowhow in how to use computers was enhanced
- Internet penetration in Armenia increased. Before this project it was 15 percent which was lower than in neighboring Georgia (20.1 percent), but by 2015 Armenia had reached 58.2 percent while Georgia's penetration remained reached only 45.2 percent.(ICR, para 59)

Objective 1(b) Address constraints to enterprise innovation

b.1 Outputs - the following summary of the project's outputs that contributed the achievement of this objective is based on information in Annex 2 of the ICR

Capacity building and enhanced IT and entrepreneurial know-how and skills

- 16,572 manpower trained and certified under the project through the GTC, VTC and mLAB, among other innovation acceleration centers set up fully or partially funded – target 650. The ICR rightly points out that the EICP faces the challenge of not knowing how well beneficiaries learned and applied IT knowledge and skills.

Gyumri Technology Center (GTC) and Vanadzor Technology Center (VTC) established and providing training and advice as follows:

- GTC provided know-how and advisory services to
 - 102 firms and entrepreneurs were serviced compared with a target 50 firms



- GTC operation supported incubation of firms (99.2% occupancy at end of the project)
- GTC Technology Extension Program delivered training to over 2000 persons and advice to over 50 firms:
 - One of the partners estimated that about 50% of trainees and supported entrepreneurs were females (ICR, para. 64) – the ICR does not provide data for baseline and target
- GTC attracted firms to work in IT sector – GTC-trained engineers and IT specialists that work or support other new companies. A survey captured limited evidence
- VTC was ready for occupancy at project closure. As the ICR was drafted, the VTC had started to provide IT trainings and incubation support to entrepreneurs and students (ICR, para. 58c).
 - IT-skills training provided to over 13,000 trainees.

Armenia Silicon Valey Representation Office was established and provided support to firms:

- US\$ 3 million of sales and investments to Armenian Tech companies –target \$1.15 million
- Negotiated the IBM-Solutions and Technology Center (ISTC) – target met
- 38 Armenian IT companies travelled to Silicon Valley for study tours but the ICR makes no mention of the impact of the tours.

Financial, advisory and promotional services to support innovation

- Funds and advice given to eligible tech companies to support innovative initiatives.
 - 31 grants, totaling \$1.2 million, awarded to technology start-ups in Yerevan, Gyumri and Vanadzor compared with a target of 27
 - 11 projects received financing, totaling US 1.6 million, from the Early-stage Venture Fund compared with a target of 12 projects
- IT firms received advisory support and knowledge capacity for innovation in the IT/knowledge-intensive industry.
 - 210 projects prepared and presented proposals to potential investors including through the U.S. Sales Representative office and conferences hosted by the Government of Armenia compared with a target of 36 projects
 - 102 multinational and local start-ups received advice from the Gyumri Technological Center compared with a target of 50
 - 8 firms received mentoring services on business development
 - 56 projects prepared and presented to potential investors, target 9 projects
 - 3 IT start-up firms were developed

b.2 Outcomes

The evidence that EICP activities addressed constraints to innovation and fostered innovative initiatives is as follows:

- Creation of applications ("apps") supporting tourism industry (e.g., Digital Gyumri), and a range of e-



commerce, transport, digital media and other sectors post project (no data on names provided in the ICR).

- Development of an application to match Armenian youth to online work opportunities (e.g., ITfreelancer.com, AvatarMe).
- Creation of Tumo (tenant of the GTC), an innovation center for children of ages 12-18 providing IT training and creative space for hundreds of children, that is helping develop a strong pipeline of talent for the region (ICR, para. 66).

This Review concluded that there were only minor shortcomings in the achievements of this project when compared with its objectives and therefore its efficacy is rated Substantial

Rating

Substantial

5. Efficiency

Analysis in the PAD

Instead of estimating the project's rate of return, the PAD for EICP provided a summary of a qualitative economic and financial impact analyses prepared by the Armenian economic analysis firm Economy and Values Research Center" (Annex 9, para 1). Based on this analysis Annex 9 summarizes a series of short- and long-term positive economic and social impacts, which included the generation of jobs, regional integration and tax revenues from increased sales of the internet services and computers, as well as the creation of new business and innovative start-ups, and the emergence of innovative products and services.

Analysis in the ICR

The ICR assessed the project's efficiency in terms of (a) "value for money" of the project's public investment in internet services;(b) improvement in the cost-effectiveness of internet security; (c) cost-effectiveness of venture funds to foster research and development in ICT companies; and (d) efficiency of project management in terms of its costs.

(a) Substantial Value for Money of internet Services.

- An investment of US\$256,570 in the rural broadband backbone network by the project enabled 172,000 people in 344 villages in a remote rural area near the border with Turkey to have access to internet services at a capital cost per person of US\$1.5 per person (ICR, para 62).
- Beneficiaries of this access were subsidized by the private sector because they were not charged for Wi Fi access, and were therefore no longer isolated in terms of communications from the rest of the country.



(b) More Competitive Market for ICT Devices

- US\$3.5 million from the project for the "Computer for All" Program enabled 37,171 households to purchase about 40,000 devices (computers, cellphones and tablets). The average cost per device was US\$88 which, in combination with a one time subsidy to commercial banks to reduce the cost of borrowing to purchase ICT devices, made devices more affordable for the population. This created a strong demand for the devices and attracted additional device vendors to the Armenian market which was a change from the original monopoly of ICT equipment suppliers. The increased competition led to a more efficient market for ICT devices.

(c) Improvement in Cost-Effectiveness of Internet Security

- Similarly, the e-ID ("Digital Citizen Program"), by spending \$1.56 million on the fixed and operating costs of creating the Certification Authority that issued close to a million e-ID certificates at a unit cost of US\$1.02 per certificate by project's close (ICR para 62). This became an efficient operation and eventually generated net revenue for the Government from each certificate issued. According to the ICR "the e-ID system has been integrated with many e-services including digital signature, tax service, e-payment, e-banking, electronic system of the Real Property Cadaster, State Population Register, licensed persons' reports, an State Register of Legal Entities" (para 65)

(d) Cost-Effective Establishment of Venture Fund to Foster Research and Development in ICT Companies

- US\$1.08 million as "seed money" the project leveraged US\$26 million from the private sector for the Venture Fund which financed 31 matching grants intended to generate ideas for research projects. From the research projects proposed 11 were funded by the Fund for implementation by 8 companies (ICR, para 51 b). However, the ICR emphasized that results from the Venture Capital Fund were not yet available. The ICR assumed that, if "the venture capital investment generates a 20 per cent rate of return within seven years, a US\$6 million venture capital investment could generate US\$25-US\$55 million cumulative volume of private Research and Development (R&D) within the period" (Annex 3, para. 2c). The ICR also stated, that: "The project is potentially laying the foundation for increased opportunities in R&D, investment and employment in the economy" (para 9) and hence more efficient innovations in the ICT sector.

(e) Project Management Costs Reflected Considerable Management Efficiency.

- At closure the latest estimate of actual project management costs (US\$1.47 million) were 53.12 % higher than the appraisal estimate (US\$ 0.96 million). According to the project team the rise in management costs reflected the reallocation of project funds away from Component 1 to subsidize the costs of the Vanadzor Technology Center. However, despite these additional costs charged against project management costs, total management costs (as well as other costs mentioned in Section 2d of this Review) accounted for only 6.3 percent of total project costs which reflected considerable efficiency in the use of project management resources for a labor intensive project.



On the basis of the evidence above this Review concludes that the efficiency with which the project's resources was used was substantial.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal		0	0 <input type="checkbox"/> Not Applicable
ICR Estimate		0	0 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

The EICP objective was highly relevant to the development goals that both the Bank and the Government of Armenia pursued (including their strategies) to achieve a deepening internet penetration and fostering enterprise innovation. The project design comprised activities that were substantially relevant to achieving the PDO. Increased broadband access, advice and financing delivered to households and businesses, and the establishment of an open market for ICT devices led to a considerable increase in internet access and a competitive internet market, which substantially addressed constraints to a competitive e-Society. The establishment of technology centers to provide training for entrepreneurs together with the financial, advisory and promotional services to IT/ITES firms resulted in substantial enterprise innovations in the ICT sector. The project's overall efficiency is also rated substantial. Overall the project had minor shortcomings and its outcome is therefore rated Satisfactory.

a. Outcome Rating

Satisfactory

7. Rationale for Risk to Development Outcome Rating



The IT sector continues to be a priority for the Government's development strategy, which was reflected in its ownership and commitment to support policies and budgetary provisions to develop the IT industry and the ICT sector. Key evidence that supports this conclusion is the fact that the Ministry of Transportation and Communication was renamed Ministry of Transport, Communication, and Information Technologies (ICR, para 42).

Project ownership by development partners was strong, suggesting the support of EICP results in the short to medium-term will continue. In addition, the operation of the Gyumri and Vanadzor Technological Centers remain sustainable with financing from the state budget and, among others, revenue from rent paid by firms established in the Centers. Indeed, the ICR states that "With respect to individual [EICP] programs, the 'Computer for All Program' is sustained under the revolving fund and is managed by the German-Armenian Foundation. In addition, ICT vendors, banks, and telecom operators that saw the benefits of scaling up similar programs using its own fund" (para. 41).

The establishment of the Gyumri and Vanadzor Technological Centers is likely to sustain efforts to enhance innovation and information technology skills development for individuals and for ICT sector companies. Sustaining partnerships to mobilize private sector resources and collaboration with universities, industry association and research institutions are in place, which also increases investment sustainability. By design, "the Vanadzor Technology Center was built on the premises of Vanadzor Branch of the State Engineering University, which helped create synergistic effects with the university curriculum, preparing talent aligned with industry demands and mitigating the supply gap of IT specialists" (ICR, para. 75c). Mainstreaming the project into existing institutions has ensured sustainability and continued buildup of project activities. The reinforcement of institutional capacity in Ministry of Economy and Ministry of Finance is likely to persist and be cemented because regular staff of the Enterprise Incubator Foundation, E-Governance Infrastructure Project Implementation Unit and the Foreign Financed Projects Management Center will continue to apply the practical know-how. Knowledge to sustain mechanisms to enable e-Society and enterprise innovation is not lost on these implementing agencies. However, aside from the innovative aspect of the first Venture Fund, direct implications for the long term and sustained competitiveness of innovative firms cannot be determined.

a. Risk to Development Outcome Rating

Negligible

8. Assessment of Bank Performance

a. Quality-at-Entry

Preparatory studies, safeguards, M&E and economic analysis were the basis for a strategically relevant design but a complex project structure, which responded to client preference for a comprehensive approach to supporting e-Society development. The ICR (para. 69) indicated that the design benefited from the expertise of seasoned specialists in ICT and private sector development. It also pointed out that the preparatory studies did not foresee the difficulties that the complex EICP design would have in slowing down the fiduciary transfers to multiple disbursement categories associated with most project components. The ICR also stressed that more attention should have been paid to the fiduciary aspects of the Venture Fund to



assure smooth implementation during the initial years. The three ensuing restructurings addressed the initial complications.

Quality-at-Entry Rating Moderately Satisfactory

b. Quality of supervision

The ICR indicated that Bank supervision proactively identified and resolved threats to the implementation of the project and also pursued opportunities in a timely fashion to ensure the proper pace of progress to achieve results by the end of the project. The mid-term review and periodical ISRs helped supervision missions resolve, for example, the initial delays linked to transferring funds to more needed activities, not risking inaction. According to the ICR, the World Bank team also “was consistently engaged in providing TA and technical experts mobilized at critical timings” (para 70). To stay the course, the 2014 restructuring was paramount in turning the project’s initial sluggish performance around. That is when the scope of the e-Society component changed resulting in the Government’s shifted priorities by focusing on support to 344 rural villages and the establishment of a technology center in Vanadzor replicating the Gyumri Technology Center. The second restructuring in 2015 also responded to the need for fine-tuning the business model for the Venture Fund (ICR, paras. 31 and 32). The biannual Implementation Status Reports (ISRs) and the ICR's Data Sheet and Annex 2 made use of the results framework matrix to present outputs by component.

Quality of Supervision Rating Highly Satisfactory

Overall Bank Performance Rating Satisfactory

9. Assessment of Borrower Performance

a. Government Performance

Government Performance

It was to be expected that the Government would be strongly committed to the PDO. However, although committing US\$6 million it disbursed only US\$4.01 million. These funds financed operating costs of implementing agencies in the Ministries of Economics and Finance namely the Enterprise Incubator Foundation (EIF), Foreign Financed Projects Management Center (FFPMC), and the E-Governance Infrastructure Project Implementation Unit (EKENG). However, lack of continuity of leadership at the Ministry of Economy slowed execution during the first half of the project. In addition, the new procurement policy, which required all foreign aid project procurement to be reviewed at the Prime Minister’s office caused major delays (ICR, para. 72 and 32e), but by project’s close implementation had not suffered



Government Performance Rating

Satisfactory

b. Implementing Agency Performance

According to the ICR, the Enterprise Incubator Foundation (EIF), Foreign Financed Projects Management Center (FFPMC), and the E-Governance Infrastructure Project Implementation Unit (EKENG) made strong commitments to the project and met their objectives. They had implementation arrangements and key staff in place, and took timely decisions on implementation issues. For example, EIF's focus on extensive consultations led to mobilizing private investment and promoting the project's long-term sustainability. The FFPMC was highly competent and ensured compliance on fiduciary aspects, and the EKENG ensured commitment to the Digital Citizens Program. (ICR, para. 73).

Implementing Agency Performance Rating

Highly Satisfactory

Overall Borrower Performance Rating

Satisfactory

10. M&E Design, Implementation, & Utilization

a. M&E Design

According to the ICR, the Ministry of Economy took charge of conducting the M&E functions. It was responsible for hiring KPMG, the financial management consulting firm that assisted the Ministry in preparing semiannual performance indicator updates. The ICR noted that M&E performance before 2014 "was downgraded from Moderately Satisfactory to Moderately Unsatisfactory because of the delays with hiring KPMG, but [a contract] was subsequently signed and finalized (with amendments to respond to the first restructuring) in October 2013." It also stated that: "Five semiannual performance reports were prepared and submitted to the World Bank between 2014 and May 2016 and were found generally to be of good quality" (ICR para 35). However, there were shortcomings in the indicators of the M&E results framework matrix. These went beyond misclassifying the technology center created in Vanadzor as part of the overarching outcomes, which happened after the 2014 restructuring and remained uncorrected until the project ended. The ICR rightly highlights that: "The intermediate outcome indicators included the 'number of manpower trained', among other relevant indicators, but this did not provide a clear linkage to increasing employment in IT/ITES" (ICR para 34). This Review also observed lack of data collection to assess reduction of rural/city disparity - yet a key priority of the Armenia Development Strategy. The ICR stated that the project's impact on gender was not a requirement during appraisal. It clarified that: "The World Bank guidelines require the adoption of this indicator for investment projects that have an approval date after July 1, 2009 (para 34)." However, the EICP was approved on 11/30/2010. Furthermore, given that measures for baselines and targets were defined two years after project effectiveness, the project missed the opportunity to include collection of gender disaggregated data on results. Moreover, the original 4 PDO indicators may well serve to verify results suggested by indicators for digitalization mainstreaming. However, the 4 PDO indicators do not measure the attribution of IECP's activities to foster innovation.



In addition, this Review found that what the PAD characterized as PDO indicators are sectoral indicators referring to productivity, which did not necessarily provide direct evidence to assess outcomes of sub-objectives. The framework would have benefitted from splitting the PDO into two sub-components directly reflecting the demand and the supply side interventions.

b. M&E Implementation

M&E implementation. The EICP undertook relevant implementation of monitoring and evaluation (M&E) activities to audit and ensure timely completion of activities within budget. Other relevant activities supported by EICP funds were public relations communications campaigns, technical assistance, capacity building and incremental operating costs (ICR, para. 19).

c. M&E Utilization

When the government requested a change of focus to fostering rural digital villages and replicating the Gyumri Technology Center in Vanadzor, the ICR indicates that: "The 2014 restructuring made comprehensive efforts to adjust the results framework to the modified components. These included fine-tuning of the scope for the outcome indicator 'Residential broadband household penetration (added "in villages")' and the deletion of four intermediate outcome indicators, and adding the Vanadzor Technology Center" (ICR para. 36-37).

This Review observed that these positive shifts in project's activities and funding reallocation resulted from the initial M&E supervision activities and the MTR recommendations.

M&E Quality Rating

Substantial

11. Other Issues

a. Safeguards

The PAD indicated that: "Civil works to be financed from the Project proceeds are not expected to have any significant or irreversible impacts." It also stated that: "The only potential long-term negative impact expected were periodic minor maintenance works on the installed wireless towers; though the strictly localized and modest nature was anticipated to have insignificant impact. Depending on the choice of location the construction and operation of these towers, their construction and operation may affect valuable natural habitats and cause mortality of birds due to aerial collisions. Therefore, OP/BP 4.04 Natural Habitats is triggered to ensure adequate screening and selection of the potential locations of wireless towers. Earth works in undeveloped landscapes may come across chance finds and OP/BP 4.11 is triggered to secure proper handling of any elements of presently unknown historical heritage in case they are



encountered.”(PAD, para. 4 of Annex 10).

The ICR explained that besides the three safeguards listed in the PAD, no others were triggered at restructuring. "The Enterprise Incubator Foundation had dedicated qualified staff working on safeguards, and safeguards compliance on all of them remained satisfactory throughout the project life" (ICR, para. 38). In 2014, backbone infrastructure activities contemplated in activity 1.1 were cancelled, thus the network towers and laying of fiber optic cable works were not undertaken. Instead the project focused on installing Wi Fi devices in government buildings in the targeted rural villages. The latter did not have any bearing on the environment, natural habitats or cultural heritage resources. The Gyumri Technology Center was housed in a historical building that had survived a major earthquake in the region. The project contributed to refurbishing this cultural landmark.

b. Fiduciary Compliance

The ICR stated that procurement, financial management and audits were all performed adequately and on time (ICR, paragraphs 39 and 40).

c. Unintended impacts (Positive or Negative)

According to the ICR there were a few unintended impacts:

- The Armenia Venture Capital became a best practice for supporting fledgling IT companies in other Bank projects and countries.
- Applications ("apps") supporting the tourism industry were developed in the Gyumri Technology Center (GTC), and for e-commerce, digital media and transport in the Vanadzor Technology Center
- Foreign investors recognized the value of the GTC. For example the ICR mentions that "a total of 16,572 people were trained in IT and entrepreneurial skills under the project in the GTC, VTC, and the various technology centers implemented under PPP arrangements with Microsoft, National Instruments and the Government of India, among others.(para 62).
- A small-sample set of interviews of knowledgeable informants carried out in conjunction with the preparation of the ICR found that a Taiwanese large manufacturer of computer networking equipment established its Research and Development Center next to the GTC building taking advantage of engineers and IT specialists trained in the GTC (ICR, para. 66).

d. Other



12. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	---
Risk to Development Outcome	Negligible	Negligible	---
Bank Performance	Satisfactory	Satisfactory	---
Borrower Performance	Satisfactory	Satisfactory	---
Quality of ICR		Substantial	---

Note

When insufficient information is provided by the Bank for IEG to arrive at a clear rating, IEG will downgrade the relevant ratings as warranted beginning July 1, 2006.

The "Reason for Disagreement/Comments" column could cross-reference other sections of the ICR Review, as appropriate.

13. Lessons

Of the four lessons proposed in the ICR, the following were selected for their general applicability:

- **Partnerships with local stakeholders enhance sustainability of results and reinforce institutional capacity building.** Project partnerships with universities, research institutions and industry associations are conducive to sustaining and even scaling up results post-project (ICR, para 75c).
- **Having regular staff of ministerial units in charge of implementing core project activities helps anchor institutional strengthening.** These are elements of a governance structure conducive to cementing knowledge and keeping it beyond the project's life. In addition, using local staff avoids escalation of project management costs for consultants (ICR, para. 75d)

Lesson suggested by IEG

1. **The rapidly evolving IT technology calls for flexibility and readiness to restructure project activities' scope and reallocation of funds.** In a fast-evolving IT sector, locking in a project to specific computer technology or not considering the impact of project activities and the actions by private sector parties operating in the same field may result in project setbacks or cause the project to become redundant.

14. Assessment Recommended?

Yes



Please explain

- **Gender impact assessment** for the project could be useful as this is a current agenda within the World Bank, but it was only emerging at the time when the project was designed (ICR p. 19, para. 64).
- **Assessment of introducing more flexibility to Bank policy guidelines.** According to Government and World Bank teams, the Bank's operational policies and guidelines were not optimal for coping with the fast-evolving and dynamic IT industry. Participating stakeholders recommended the need to review policies and guidelines and make them more agile. They highlighted that the Bank lost the opportunity to pilot more flexible policy guidelines to capture the advice from implementers to determine the scope of reforms to Bank guidelines.
- **This project is a potential example for the Bank's efforts to promote South-to-South Cooperation and Knowledge Exchange.** The Armenia experience adds a valuable best practice to the Bank's South-to-South knowledge-exchange. The ICR highlights that there are opportunities for the Bank to capture and document the tools, processes and lessons learned from the Armenia EICP to facilitate access to finance. Furthermore, the success of the novel Venture Fund in Armenia constitutes a model of what works for fostering investors' confidence. Policy makers and development practitioners could benefit from Armenia's experience, both in mainstreaming digitalization and in funding IT innovation projects. Similarly, the project offers valuable lessons for promoting innovation and SME growth in the IT sector.

15. Comments on Quality of ICR

The ICR is concise and, in general, candid in most sections. The ICR provided a clear overview on the rationale of the project, preparative studies and different dimensions that it sought to enhance. The narrative on implementation was concise and clear, detailing successes and the challenges that the project overcome. The ICR succeeds in highlighting indicators and achievement of targets, facilitating the contrast between original and attained targets.

However, the ICR had shortcomings in how it discussed the links between inputs, outputs and outcomes to support the achievement of the project objective, and how it derived lessons from the project. The specific shortcomings were the following:

- Section 3.2 of the ICR assessed the achievement of the PDO's two sub-objectives (i.e. removing constraints to a competitive e-Society and constraints to enterprise innovation). It also assessed "strengthening the underlying infrastructure and enabling environment" (para 46). However the latter activity was not part of the PDO and as a result the ICR misrepresented the achievement of the project development objective in Section 3.2.
- Half the lessons were either a conclusion or a finding and not lessons. The creation of the innovative Venture Fund was an outcome, and recommending that the use of "Program for Results" instruments instead of locking in the program to specific activities was a finding (ICR, para. 75).



a. Quality of ICR Rating
Substantial