

## “ICT Cooperation through Software Processes Improvement”

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**Regional  
Competitiveness  
Initiative**

**Need for  
partnership  
through  
quality**

The ICT sectors of the SEE countries have gone through significant transformations in the last fifteen years. A shift from the capital-intensive hardware production to the knowledge-intensive software production has taken place simultaneously with the privatization of the companies. The well-educated human resource and the long lasting traditions in ICT, in combination with the competitive labor costs, have been the main success factors that contributed towards the rapid growth of the ICT Sectors. The companies in the region, most of which are SMEs, face global competition by several times bigger outsourcing destinations such as India, China, Russia and others.

An important prospect for the SEE countries, that did not exist until very recently, is the opportunity for small and new entrepreneurs to build effective cooperation based on quality, using the latest models for organization and management of software engineering processes such as Capability Maturity Model Integration\* (CMMI).

The Capability Maturity Model Integration (CMMI) is an integrated model for systems and software engineering process improvement, integrated product and process development improvement and supplier selection. It integrates best practices from disciplines such as software engineering, management systems engineering and software acquisition, that were typically addressed as separate improvement initiatives in the past.

Getting the people-process-technology triad working at "its best" is imperative for those organizations in the region that want to compete on the global market. The complexity of the products and the influence of internal and external requirements and pressures indicate that organizational prosperity in the future will be highly influenced by the willingness of the organizations in the region to address process improvement across the entire product development life cycle – from conception through delivery and maintenance.

CMMI implementation, particularly for small and medium-sized firms, results in numerous advantages and thus increases the competitiveness of the ICT sector and of the whole economy.

Through CMMI process improvement an organization can gain five primary classes of benefits:

- **Cost:** reductions in the cost to find and fix a defect, and improved average costs for software development
- **Schedule:** increased percentage of milestones met and predictability in meeting schedules.
- **Quality:** improvements in quality, related to reducing defects over time or by product life cycle.
- **Customer Satisfaction:** improvements in customer satisfaction and increased business base.
- **Return on Investment:** positive return on investment from CMMI-based process improvement

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\* Capability Maturity Model Integration and CMMI are registered in the U.S. Patent and Trademark Office by Carnegie Mellon University

IT development units of some of the worldwide industry leaders have reported significant improvements in these categories<sup>†</sup>:

<b>Performance Category</b>	<b>Median</b>	<b>Low</b>	<b>High</b>
Reduced cost	20%	3%	87%
Increased productivity	62%	9%	255%
Improved quality	50%	7%	132%
Improved customer satisfaction	14%	-4%	55%
Positive return on investment	4.7 : 1	2 : 1	27.7 : 1

Source: SEI <http://www.sei.cmu.edu/cmmi/results.html>

In many cases CMMI is a prerequisite for subcontracting with multinational corporations such as Siemens, Motorola, General Motors, JPMorgan and government agencies such as Department of Defense and Department of Energy. Therefore CMMI implementation becomes an important step towards increased competitiveness on the global market for high-quality software solutions.

**On regional level CMMI can empower cooperation between SMEs.** It can be a common language in the communication among them and with worldwide leaders.

A joint regional program can result in the following additional advantages:

- Creation of local capacity in software process improvement and shared training cost.
- Exploration of new possibilities for regional cooperation among ICT organizations.
- Exchange of information about new market opportunities and business conditions
- Generation of ideas and planning of new projects of common interest

The IT organizations in the region have clearly identified the need for intensive growth based on effective and efficient processes that use the latest models for process improvement. CMMI has been recognized as a tool for increased competitiveness not only by the companies but also by the IT associations and governments in the region. It was identified as a priority by the major ICT associations and/or was a central theme at the major forums in the region.

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<sup>†</sup> This table summarizes quantitative information from 25 organizations that have reported results that can be expressed as performance changes over time.

## **ESI Center Bulgaria Profile**

**The European Software Institute** (ESI) [www.esi.es](http://www.esi.es) is one of the world's leading independent authorities on software process improvement. Established in 1993 and with its headquarters in Spain, ESI is a not-for-profit organization, which offers consultancy and training services, supported by a highly qualified team of experts and an extensive network of international alliances.

### ESI capabilities:

- 9 SW CMM and 2 CMMI Official Instructors, accredited by SEI
- 3 SEI Authorized CBA IPI Lead Assessors (SW CMM) and 2 SCAMPI Lead Appraisers (CMMI)
- SEI Transition Partner for performing SCAMPI Assessments since July 2002 and for CMMI Training since 2003
- More than 2.000 professionals officially trained by ESI worldwide from over 450 organizations in 20 countries
- 12 full-time consultants allocated to CMM-based services

**ESI Center Bulgaria Foundation** [www.esicenter.bg](http://www.esicenter.bg) was established in June 2003 as the Regional Software Engineering Excellence Center of the European Software Institute, designed to become a major driving force for increased industry competitiveness in the Balkans and Eastern Europe.

Founding partners of the center are the European Software Institute (ESI), the Bulgarian Association of Software Companies (BASSCOM), and the State Agency for Information and Communications Technologies (SAITC).

ESI Centers Bulgaria transfers new methodologies for software process improvement (CMM@I, BITS – Balanced IT Scorecard, REUSE, PEPIT - Professional Engineering Process Improvement Training). ESI center Bulgaria is a member of the ESI Centers Alliance, which consists of ESI and ESI centers in Mexico, Brazil, Australia and Shanghai.

ESI center Bulgaria's main activities are:

- **Building awareness about new methodologies.** ESI Center has presented the latest methodologies for strategic management and software process improvement in more than 30 workshops, courses and international conferences. In addition, more than 65 direct meetings with senior managers from the best ICT companies have been held. As a result of this campaign many of the best ICT companies in the region are aware about methodologies such as CMMI, BITS, etc.
- **Formal training through "Introduction to CMMI"** 3-day course, officially authorized by SEI. The training is useful to software company professionals who want to participate in the official CMMI appraisal project. ESI has so far trained all over the world about 400 people in CMMI and 1500 in CMM and CMMI. ESI Center Bulgaria has trained more than 80 experts in 5 courses in SEE.
- **Regional development.** In correspondence with its mission to increase ICT competitiveness in the region ESI Center has launched activities in other countries in Eastern Europe. The center has established a fruitful cooperation with the IT association in the region. Its staff gained valuable experience in organization of software process improvement training and consultancy programs. ESI Center Bulgaria employees understand the regional needs and speak several regional languages - Bulgarian, Romanian, Russian, Macedonian, Serbian and Ukrainian.
- **Consultations to companies.** ESI Center Bulgaria has launched activities with 6 companies on the way of implementing CMMI to achieve Maturity Levels 2 and 3. According to the official statistics of Software Engineering Institute (SEI) the average implementation period for a company to advance one maturity level is from 12 to 24 months. So ESI Center Bulgaria is planning to organize official appraisals in 2006 - 2007 when the first companies from the region will be certified according to CMMI.

## Capability Maturity Model Integration®

CMMI®

<http://www.sei.cmu.edu/cmmi/>

The latest standards used worldwide to improve quality of products are ISO, CMM®I, SPICE. Recently Capability Maturity Model® Integration CMMI, developed by Software Engineering Institute, SEI has become recognized as the most valuable model for software process improvement in the most developed markets all around the world. In many cases it is a prerequisite for subcontracting with multinational corporations and government administrations.

Capability Maturity Model® (CMM®) is a process proposed by the Software Engineering Institute (SEI) which provides a 5-level framework to bring an organizations software development process from an immature, chaotic to a mature, disciplined process. CMM was developed for different disciplines: *systems engineering, software engineering, software acquisition etc.* In order to combine all CMM® models an integration of the model was performed achieving CMMI®.

The Capability Maturity Model Integration (CMMI®) is an integrated model for systems and software engineering process improvement, integrated product and process development improvement and supplier selection. It integrates best practices from disciplines such as software engineering, management systems engineering, software acquisition that were typically addressed as separate improvement initiatives in the past. It is published in 2 representations: "*staged*" (like SW-CMM) or "*continuous*" (as required by the emerging standard ISO15504, as a result of the SPICE project). This methodology describes process areas which are organized into 5 maturity levels in order to support and guide process improvement. With each process area are associated goals to be implemented to satisfy the process area and practices, which are activities expected to be performed to achieve the goals.

CMMI encourages organizations to address the full product development life cycle, independent of whether the product is a software system, an automatic teller, a mobile phone etc. Once implemented in organization CMMI can significantly increase effectiveness and efficiency of the software processes and guarantee high quality of the products.

In contrast to ISO standard CMMI is oriented towards continuous improvement along maturity levels. As a company moves from one maturity level to another it improves quality of its processes and becomes more and more competitive.

**Software Engineering Institute** (SEI) provides the content for the models CMMI through its transition partners. SEI service providers deliver all cycle of services regarding CMM®I: awareness, training, consultancy, appraisals.

### **CMMI Statistics worldwide:**

- **1264 appraisals**
- **1106 organizations 38% of which in USA**
- **644 participating companies**

Source: SEI Maturity Profile, March 2006

**ITMark - a Quality Seal for SMEs on the global information technologies market**

[www.itmark.org](http://www.itmark.org)

ESI Center Alliance has launched worldwide the IT Mark Certification, that certifies the quality and maturity of the processes in SMEs that develop and maintain Information Technology (IT) Industry Systems.

This new quality seal was launched due to the general perception among IT SMEs that the Quality models (CMM, CMMI, SPICE...) existing in the Sector are designed for large organizations, and therefore are not properly adapted to SMEs, since the deadlines are long and the cost and requirements of implementation are high, whereas models such as ISO 9001 are too general. Therefore, there is a need for a specific model designed with and for Information Technology SMEs Industry.

In general, SMEs need to improve their Software & Systems processes, but also other Management processes that the usual models normally do not consider. This is why IT Mark assesses and certifies the quality of SMEs in three main areas: one related to overall Business Management (strategic, commercial, financial, marketing, etc); another on Information Security Management; and the third one, specifically related to the Maturity of their Software & Systems Processes. In matters relating to Business Management the reference used is the 10-Squared model, which was developed to assess applications for Venture Capital. From the Information Security Management point of view, the reference model is the ISO 17799, whereas for Software & Systems a lightweight version of CMMI is used, a standard globally acknowledged by the IT world with which ESI has broad experience in providing services to enterprises.

Even though the current market standard, the CMMI model, establishes 5 levels of maturity in Software development processes, IT Mark distinguishes three categories, ITMark, ITMark Premium and ITMark Elite depending on the Maturity shown by all the SME's processes. The Service also defines Improvement Actions, and seeks to launch SMEs into a process of Continuous Improvement that is fully compatible with the CMMI model. The certification is valid for two years, in order to make sure the maintenance of the accredited level for each company. At the same time, ESI does manage a Web on which the market and all interested parties can see which companies have the brand.

To date, ITMark certification have been carried out with Australian, Bulgarian, French and Spanish companies. After these initial steps, the prospects of implementing a new quality brand are very favorable, state the promoters. This is due to the interest shown by the companies and even the Domestic and Foreign Public Administrations to whom the idea has been presented, and also to the large size of the market targeted. In Europe, for instance, 99.8% of the IT sector's companies are SMEs (up to 250 workers), and 85% are micro-SMEs (up to 10 workers), out of a total of a quarter of a million firms. This gives an idea of the dimensions of its potential market.

## ITcard

### ITcard –The reliable way to prove your IT skills

[www.itcard.org](http://www.itcard.org)

ITcard is developed by the European Software Institute (ESI) as a Basic Information Society Technologies Skills Certificate. ESI certifies that the people who have obtained the ITcard have undergone theoretical and practical testing, which has shown their knowledge of basic concepts of information technologies and their ability in the use of a personal computer for its basic applications.

The ITcard certification is based on the "Scheme of Contents of Good User Certificate by European Software Institute Centers Alliance Certification" guidelines. At present this scheme of contents is focused on basic software applications for a single user, such as operating systems, word processors, spreadsheets, databases, presentational and graphics tools and Internet tools, both for web-browsing and E-mail management systems. However, this scheme of contents is by no means restricted to the above ITs.

ESI guarantees that the certification obtained through ITcard testing, developed by European Software Institute Centers Alliance, is a truthful and fair process.

**No previous special training** (academic or otherwise) is required to obtain **ITCard** certification. There is no limitation as to the manner in which training can be acquired or to the place at which training can be obtained.

**ITCard** is:

- **Independent.** Both from training providers and from any ICT organisation or technology;
- promotes **Continuous** improvement and self-learning;
- facilitates the **deployment of the Information Society**;
- a valid tool for evaluating the **e-readiness** among the Society and Businesses.

**ITCard certificate's purpose** is to:

- provide independent measure for e-literacy and e-readiness;
- enable companies and state institutions to evaluate and certify their staff and to increase competitiveness on a global scale;
- allow individuals to assess and improve their employability skills.