




# Experience of SMEs with Software Process Improvement

Iñigo Garro

SQI Event - Budapest  
*The complex world of software quality*

15 April 2005



## Summary

- ⊕ ESI
- ⊕ Software process improvement and quality: benefits and costs
- ⊕ Software quality standards
- ⊕ SMEs and their approach to software quality
- ⊕ Some solutions for SMEs

© ESI 2005      2      SQI Event, Budapest – April 2005

**ESI** European Software Institute *tecnalia*

## Non-profit member-based Foundation

**ESI Patrons (some)**



- Founded in 1993 by leading European Software Companies with the support of the European Commission and the Basque Government.
- Established in Zamudio, near Bilbao, Spain.

© ESI 2005      3

ISO 9001:2000  
Certif. DNV 2367  
SQI Event, Budapest – April 2005

**ESI** European Software Institute *tecnalia*

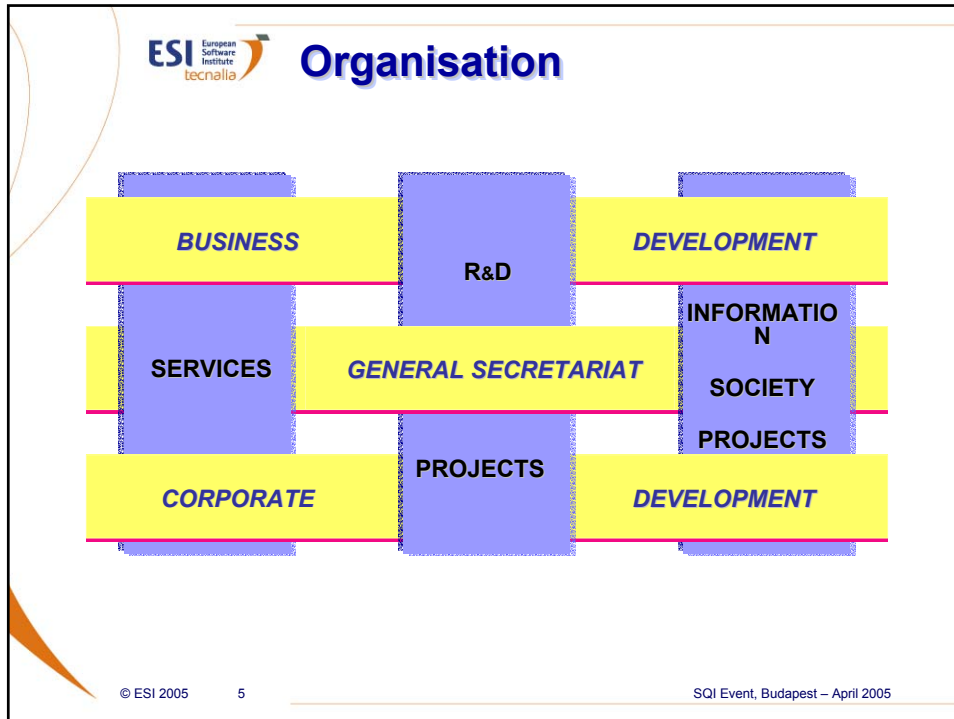
## Mission statement

**Contribute to developing the Information Society and to increasing industry competitiveness by means of**

**knowledge,  
innovation,  
continuous improvement, and  
the promotion and dissemination of  
Information Technology**

© ESI 2005      4

SQI Event, Budapest – April 2005



- 
- ES** European Software Institute **tecnalia** **Current technological lines**
- ⊕ Process improvement and quality management
    - SW CMM/CMMI, ISO/IEC 15504 (SPICE), Personal Software Process
    - Balanced IT Scorecard, Measurement programmes, Cost of Quality technique
  - ⊕ Systems and services engineering
    - Reuse and software factories
    - Product lines
    - Model Driven Development (MDD)
    - COTS management
  - ⊕ Information Security Management
  - ⊕ Information Society Projects
- © ESI 2005 6 SQA Event, Budapest – April 2005

**ESI** European Software Institute *tecnalia*

## Internationalisation- I

ESI@net World Presence



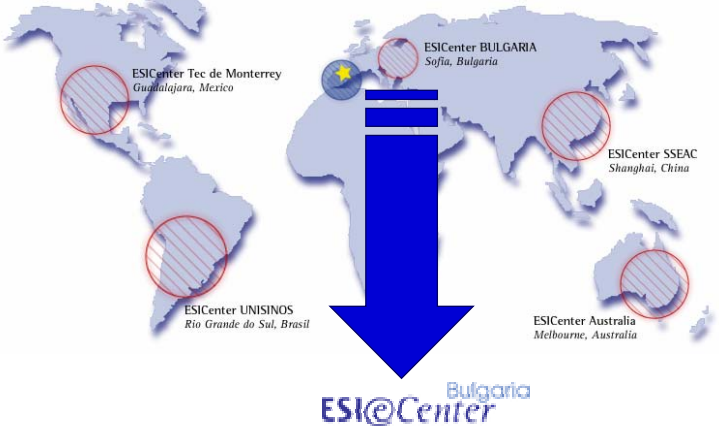
Argentina, Australia, Austria, Balkans, Belgium, Brazil, Canada, Chile, China, Colombia, Costa Rica, Cyprus, Denmark, Estonia, Finland, Germany, Greece, Hungary, India, Indonesia, Ireland, Israel, Italy, Latvia, Lithuania, Malaysia, Mexico, New Zealand, Peru, Philippines, Portugal, Puerto Rico, Russia, Saudi Arabia, South Korea, Spain, Sweden, Thailand, The Netherlands, United Kingdom, Uruguay, U.S.A, Venezuela, Vietnam

© ESI 2005 7 SQI Event, Budapest – April 2005

**ESI** European Software Institute *tecnalia*

## Internationalisation - II

ESI@Center Network (2.003)



ESI@Center Tec de Monterrey  
Guanajuato, Mexico

ESI@Center UNISINOS  
Rio Grande do Sul, Brasil

ESI@Center BULGARIA  
Sofia, Bulgaria

ESI@Center SSEAC  
Shanghai, China

ESI@Center Australia  
Melbourne, Australia

Bulgaria  
ESI@Center

© ESI 2005 8 SQI Event, Budapest – April 2005



**SPI and Quality: costs and benefits**



**Reality of the Situation...**



**“Only 34% of software projects are successful.”**

Standish Group, CHAOS Report, 2003

© ESI 2005 10 SQI Event, Budapest – April 2005

ESI European Software Institute tecnalia

## Quality is not free...

### Cost of Quality Cost

Prevention	Appraisal	Internal Failure	External Failure
<b>Costs associated with preventing defects</b>	<b>Costs associated with "looking" for defects</b>	<b>Costs associated with defects found prior to implementation / release</b>	<b>Costs associated with defects found after the product is implemented / released</b>
<ul style="list-style-type: none"> <li>Planning</li> <li>Documentation</li> <li>Training</li> <li>Tools</li> <li>Policies and procedures</li> <li>Quality improvement projects</li> <li>Data gathering and analysis</li> <li>Fault and root cause analysis</li> <li>Quality reporting</li> </ul>	<ul style="list-style-type: none"> <li>Reviews</li> <li>• System</li> <li>• Requirements</li> <li>• Design</li> <li>• Test Plan</li> <li>• Test Script</li> <li>Walkthroughs and code inspections</li> <li>• Testing (First-time)</li> <li>Audits</li> <li>CMM Assessments</li> <li>• Class A., B, C</li> </ul>	<ul style="list-style-type: none"> <li>Rework</li> <li>• Requirements</li> <li>• Design</li> <li>• Code</li> <li>• Documentation</li> <li>Defect re-testing</li> <li>Process losses (testing downtime, changing deliverables, schedule slips, cost overruns, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Warranties</li> <li>Complaint adjustments</li> <li>Lost projects</li> <li>Tech support</li> <li>Subsequent releases, patches, "Service Packs" (MS terminology)</li> </ul>

© ESI 2005 11 SQA Event, Budapest – April 2005

ESI European Software Institute tecnalia

## ... but is better than other alternatives

Year / CMM Level	New Development (%)	Cost of Conformance (%)	Cost of Nonconformance (%)
1988 - CMM Level 1	39	20	41
1990 - CMM Level 2	58	21	21
1992 - CMM Level 3	67	23	10
1995 - CMM Level 4	77	17	6

ROI 7.7:1, Productivity ↑140%, \$4.48M savings over 6 projects in 1 year

Source: Rathenon Electronic Systems Experience in Software Process Improvement, CMU/SEI-95-TR-017, November 1995

© ESI 2005 12 SQA Event, Budapest – April 2005

ESI European Software Institute **tecnalia**

## Software quality models & standards

PURPOSE	PROCESS QUALITY	PRODUCT QUALITY
General	SW CMM / CMMI ISO/IEC 15504 (SPICE) ISO/IEC 90003:2004 TickIT EFQM	ISO/IEC 9126 ISO/IEC 14598
Quality Management in several sectors	TL9000 – Telecom AQAP 110/150 – NATO/Military ISO/IEC 13485 – Health SPICE for SPACE (S4S) AutomotiveSPICE	C€ Mark for medical devices
IT Services	ITIL / BS 15000 COBIT eSourcing Capability Model	
Information Security Management	ISO/IEC 17799 / BS 7799	ISO/IEC 15408 Common Criteria ITSEC Trustmarks
Others	Regional initiatives: Mexico (MOPROSOFT) Brazil Costa Rica Korea (KSPICE)	WAI Guidelines – Web Accessibility Initiative


© ESI 2005 13 SQI Event, Budapest – April 2005

- ESI European Software Institute **tecnalia**
- ## SMEs vision
- ⊕ SMEs also need to show their customers that they do a better job than most others
  - ⊕ A Certification of **IT Excellence** is desired?
  - ⊕ Everyone is usually committed to **Continuous Improvement** in small organisations
  - ⊕ The **market** asks for never-ending improvements in Cost, Leadtime and Quality
  - ⊕ A common perception of SMEs in the IT market is that quality and process improvement models are too “heavy” (not cost-effective) for them
  - ⊕ Such comment is not 100% fair, but in fact SMEs tend to avoid such models, unless required by their customers. Therefore they are left without a reference model which targets SMEs
- © ESI 2005 14 SQI Event, Budapest – April 2005


 **Solutions for SMEs - 1**


- ⊕ **Most resources required to implement quality management are internal to the organisation**
  - The SMEs and local companies should be able to assume these costs as well as organisations of other countries
  - This implies a change to our management processes and approaches
- ⊕ **The external costs come from the following sources:**
  - Training on process improvement and quality management techniques
  - Tools that support the implementation of the requirements/processes suggested by each model
  - Process and/or Product diagnosis/audits/appraisals

© ESI 2005 15 SQA Event, Budapest – April 2005

 **Solutions for SMEs - 2**

- ⊕ **Actions that may be taken to minimise the costs**
  - **Increase the number of local experts, personnel authorised to provide services and laboratories/institutions that certify processes and products (e.g. Argentinian case)**
  - **Funding programmes to improving competitiveness**
    - ✦ international programmes (UN, EBRD, ...)
    - ✦ local public administrations
    - ✦ industrial associations (e.g. 90 peruvian organisations approaching CMMI in the next 3 years)
  - **Embark into a new quality mark targeting SMEs**

 **COOPETITION??**

  
**IT Mark**  
Information Technology Mark®



© ESI 2005 16 SQA Event, Budapest – April 2005








- **IT Mark = IT Excellence**
- **IT Mark is the first international Business and Technical process Certification service designed specifically for IT SMEs**
- **IT Mark provides an entry-level product designed for Small Enterprises, but which can help SMEs grow along the Quality Ladder**
- **For organisations which develop and maintain IT solutions**
- **Designed for Small (up to 50 employees) and Micro (less than 10) Enterprises**
- **Appraisal of**
  - Business Management,
  - Information Security Management (based on ISO/IEC 17799)
  - Software and System Processes (based on CMMI)

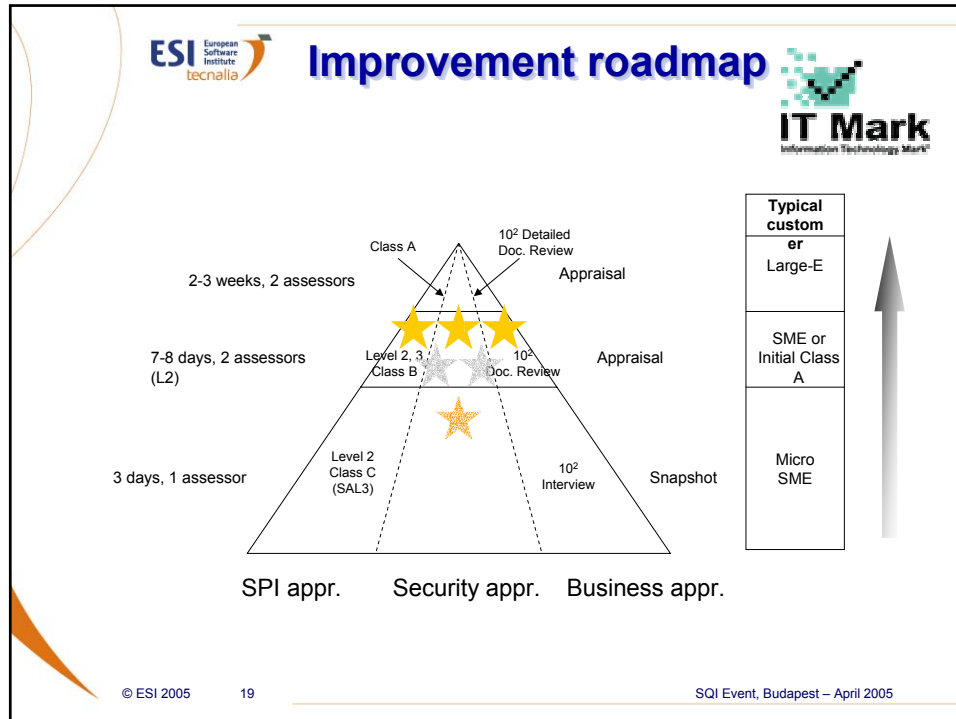
© ESI 2005 17 SQA Event, Budapest – April 2005



## IT Mark Grades

- **ITMark One Star:** represents a company which is aware of the issues related to Technical, Security and Business management, and has already taken steps to control them 
- **ITMark Two Stars:** represents a company which has achieved significant Business, Security and Software development capability, according to world-class models 
- **ITMark Three Stars:** represents a company which has achieved good Business, Security and Software development capability, so that the quality of their products is expected to be good due to their mature Continuous Improvement Processes 

© ESI 2005 18 SQA Event, Budapest – April 2005



- 
- IT Mark Grade maintenance**
- ES I European Software Institute tecnalia
- ⊕ **Grade maintenance needs to make sure that the business and Organization's maturity does not degrade (similar to the ISO-9000 strategy)**
  - ⊕ **Therefore,**
    - **The IT Mark grade would become obsolete 24 months after its award**
    - **The requirement is for**
      - A new simplified appraisal (similar to the One-Star appraisal) every 2 years for grade maintenance, irrespective of its being One, Two or Three Stars
      - Complete repeat appraisal of whatever grade, every 4 years
- © ESI 2005 20 SQI Event, Budapest – April 2005

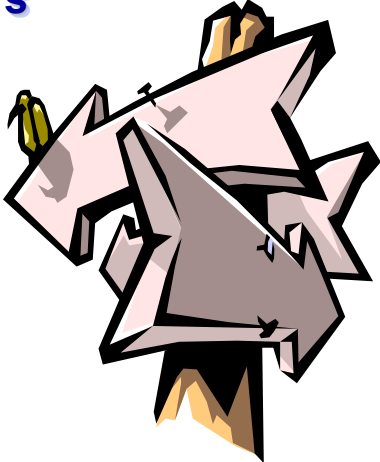
**ESI** European Software Institute **tecnalia** **The voice of our customers ...**

- ⊕ **A key business improvement initiative for 2005**
- ⊕ **Let us align ourselves with best practice and take the business to another level**
- ⊕ **Has let us reduce rework and increase staff satisfaction through pride in engineering**
- ⊕ **Right balance between CMMI and the more agile approach needed by SMEs**
- ⊕ **An opportunity to be proactive in my market**

© ESI 2005 21 SQA Event, Budapest – April 2005

**ESI** European Software Institute **tecnalia** **Can PI do for you what it's done for others?**

**It's your decision!**



© ESI 2005 22 SQA Event, Budapest – April 2005

**For more information ...**

**Iñigo Garro**  
Services Area  
Director  
[inigo.garro@esi.es](mailto:inigo.garro@esi.es)  
[ITMark@esi.es](mailto:ITMark@esi.es)

Parque Tecnológico, # 204  
E-48170 Zamudio  
Bizkaia (Spain)  
Tel.: +34 94 420 95 19  
Fax: +34 94 420 94 20  
[www.esi.es](http://www.esi.es)

