

# Human Resources Based Improvement Strategies – the Learning Factor

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**Abstract:** Processes usually are defined according to underlying standards (ISO 15504, ESA ECSS, ISO 9001, ...) and are described with process steps to be performed by roles and producing results (outputs) from well defined inputs, methods and tools to support the process steps, and activities to be done and skills to be covered by roles [5]. Assessments and resulting improvement initiatives very much focus on the processes and less on the human resources based strategies.

In this paper we want to emphasise that both issues are of equal importance, the processes and the highly skilled human force. We also highlight a currently running European strategy (European Certification and Qualification Association – [www.ecqa.org](http://www.ecqa.org)) and a funded technology project EU Cert Campus (2008 – 2010) which support the establishment of such a human resource and learning strategy in Europe.

## 1. Motivation

European studies (1998 – at 200 firms [7], 2002 – at 128 multinational firms [8], 2003 – in 59 networked European organisations [1], [2], [3]) illustrate that the success of an innovation or improvement is not just dependent on the correct technical approach. A lot of learning strategy related aspects influences the success. See Figure 1.

Beside top management support the study outlined a positive learning culture (learning from mistakes, team learning, knowledge sharing, etc.) and a supporting organisational infrastructure which helps with the implementation of the learning organisation [8].

Please note that we regard human skills as a complementary set needed in addition to qualified processes to be successful on the market.

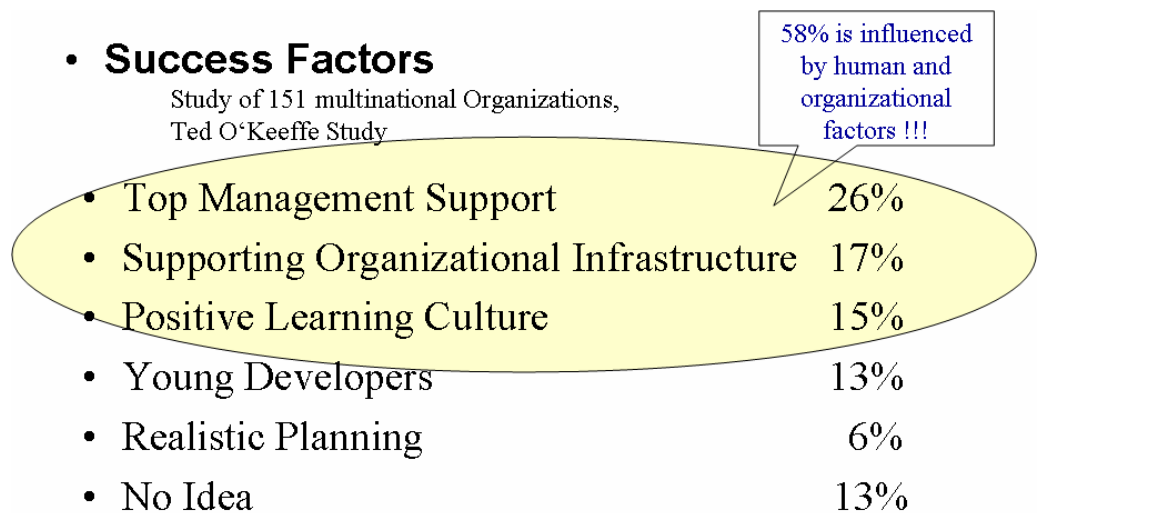


Figure 1: Success Factors Influencing the Implementation of Innovation and Improvement

## 2. What is a learning organisation?

A learning organisation [6],[7],[8],[10] creates a positive learning culture and enables team learning and synergy exploitation in an organisation. By team learning knowledge is spread much more quickly and a high level of a skilled human force is maintained.

Typical examples of failure are

- You recognise that for the implementation of a new product or new processes you lack specific skills and have no chance of acquiring them in time.
- You recognise that departments inside the company have the knowledge but do not want to share it with other departments.
- You recognise that your competitors have formed a group to share knowledge and jointly compete against you on the market.
- You recognise that some of your management staff does not fully understand the mission.
- You recognise that someone in your firm bought a knowledge management system but none uses it.
- Etc.

Typical examples of success are

- You linked in time yourself to experience partnerships and training networks and can react on the market immediately with any skills required.
- You manage that knowledge and team learning is used in a synergy approach between the departments and teams.
- You were the one who formed the group that jointly learns and shares knowledge and collaborates against your competitors.
- You ensure that the mission is a goal which binds everyone to a big picture.
- You analyse the core knowledge (the one that differentiates you from the competitors) and build all knowledge management strategies around that core (=realistic and not holistic knowledge management!).
- Etc.

In learning organisations there is an infrastructure in place which enables the team learning and the spreading of knowledge and team communication.

Ted O’Keeffe described such a learning organisation model which was published in the Journal of Industrial Computing in the EU. [8]

### 3. The Relationship Between Processes, Job Roles, and Skills

From the European studies you can see that above 58% of the success factors to implement learning organisations depends on human factors. Figure 2 illustrates that processes require roles and roles need specific skills to efficiently perform the job. In ISO 15504 a capability level 3 would, for instance, require the definition of competence criteria per role.

Combining this approach with the learning organisation related approach leads to a framework (see Figure 1) where it becomes extremely important to think in terms of job role based qualification and skills.

#### Processes and Human Resources

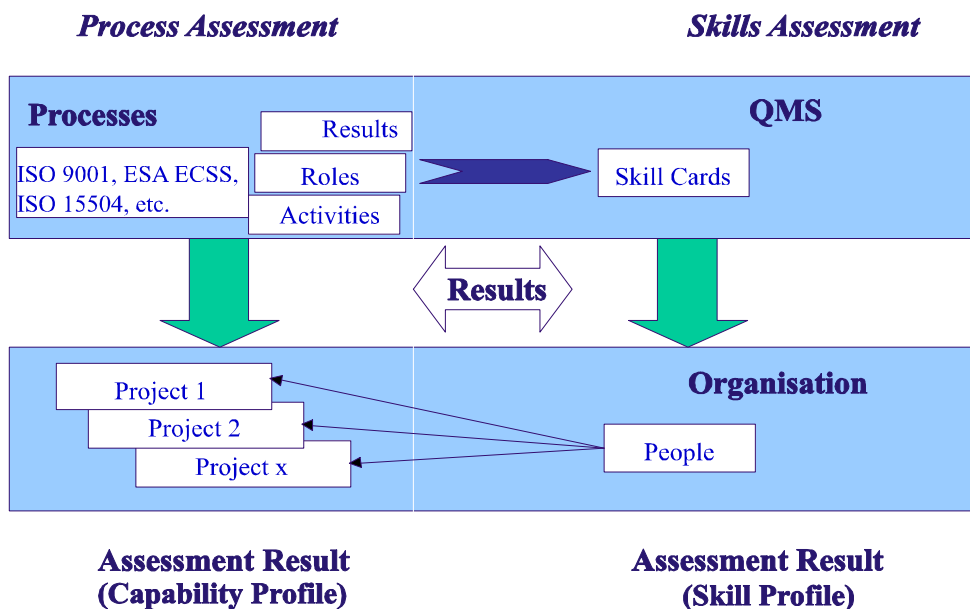


Figure 2: Processes and People – an Interrelated Framework

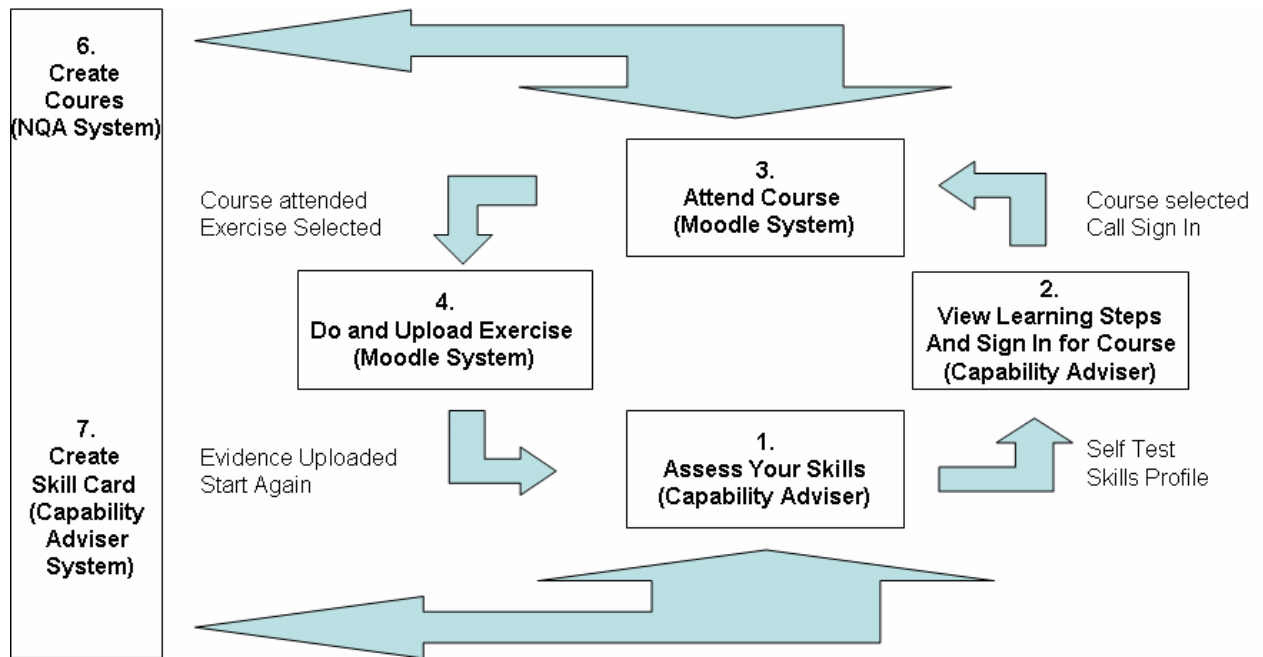
This is the reason why the following skills acquisition strategies base on specific job roles and their qualification needed to efficiently manage the development (e.g. job roles SW project manager, SW architect, etc.) and enable learning (e.g. job roles innovation manager, SPI manager, etc.)

### 4. The Skills Acquisition Strategy

#### European Level

We have set up a partnership of experienced partners in 18 European countries to create a pool of knowledge for specific professions. This pool can be extended to further professions.

If there is a need a person can attend a course for a specific job role online through an advanced learning infrastructure. See Figure 3.



**Figure 3: The Integrated European Skills Acquisition and Learning System**

You start with a self assessment against the skills [2], [5], [12]. Then you can sign into an online course. Here you are guided by a tutor and do a homework which is being corrected by the tutor. Finally the homework and real work done in your project is sufficient to demonstrate the skills.

**Moodle** – This is a web based learning management system which is public domain available. ([www.moodle.com](http://www.moodle.com))

**Capability Adviser** – This is a web based assessment portal system with a defined interface database to connect the systems. (<http://www.iscn.com/projects/piconew/>) [12]

**NQA** – Network Quality Assurance – This is a web based team working tool which was developed in the EU IST 2000 28162 project. [5]

So far the following profession have been configured –

- Software Process Improvement Manager
- Software Architect
- Software Project Manager
- IT Consultant
- EU Project manager
- Innovation manager
- Security Manager
- Configuration Manager
- Internal Financial Control Assessor
- Etc.

See [www.eu-certificates.org](http://www.eu-certificates.org)

### *Company Level*

We have installed similar platforms and strategies in multinational organisations so that their process related training programs can be delivered in this advanced form of human skills acquisition management (either at central sites or learning centres).

## 5. The Skills Provision Strategy

### *European Level*

On an annual basis the existing platform of knowledge is continuously enhanced. Existing skills sets are being reworked and new skills sets will be added. Joined knowledge is being configured in form of a job role with standard content structures [2],[5],[6],[12]:

- Skills set
- Syllabus
- Learning materials and online configuration (added by the new initiative EU Cert Campus – LLP project 2008 – 2010)
- A set of test questions

So called job role committees regulate the content for a specific skills set.

The job role committee for innovation manager, for instance, created a skills set of an innovation manager together with a set of online courses etc. People can register from the work place.

The screenshot displays a web-based assessment interface. At the top, there is a navigation bar with links: Home, Evidences, Learning, Exam, Self Test, Assessment, Settings, Help, and Logout. On the left side, a sidebar menu lists categories: CAST Case Studies, COM Communication Skills, MGM Management Skills (with sub-items: Corporate Wide Innovation Management, Innovation Aspects in Project Management, Innovation Process Management), PC Personal Characteristics, TW Team Working, and UND Understanding Innovation Management. The main content area is titled 'Innovation Manager' and 'Job Role Innovation Manager'. It shows 'Management Skills' and a note: 'This skills unit consists of 3 elements: Innovation Aspects in Project Management, Innovation Process Management and Corporate Wide Innovation Management.' Below this, there are buttons for 'Show Assigned Evidences' and 'Assign Evidences'. The section 'Corporate Wide Innovation Management:' contains two assessment items:

- MGM.E3.PC1**: She/he knows how to professionally formulate and establish corporate innovations missions. Grading options: Poor, Fair, Good, Excellent, Not App. Buttons: Self Test, Note, Assessors.
- MGM.E3.PC2**: She/he knows how to professionally derive from the corporate innovation mission specific innovation goals and to formulate and establish the goals. Grading options: Poor, Fair, Good, Excellent, Not App. Buttons: Self Test, Note, Assessors.

Below the second item, there is a question: 'What are the learning antecedents for innovation missions according to the Ted O'Keeffe 2002 study at above 150 organisations?' with four checkboxes: Nature of business, Customer Responsive Culture, Intellectual Capital, and Defined Learning Process. At the bottom, another question is partially visible: 'What are typical characteristics of an innovation goal based on the 1998 study?'

**Figure 4: Skills Assessment**

Please click one of the following units from the list below to display the available courses: Show all courses

» **Understanding Innovation Management**

Unit/Element	Title	Course Start Date		
E: Introduction to Innovation Management	Public Introduction to Innovation Management Cours	2007-02-26	More Information	Sign In
E: Skills Management	La gestión de competencias profesionales	2005-11-01	More Information	Sign In
E: Customer Relationship Management	Customer Relationshih Management	2005-05-23	More Information	More
	Public Customer Relationship Management Course	2005-06-16	More Information	Sign In
E: Market Research	Spanish Market Research	2005-11-01	More Information	Sign In

» **Communication Skills**

» **Management Skills**

Figure 5: Sign Into Courses

**Topic outline**

In this element the student should know base elements about innovation management. This includes: Definition of innovation, Definition of innovation management, Potential of an innovation, Innovation and business objectives, Relationship to other management disciplines, Models of innovation, How to accept new ideas, Ideas inside and outside the organization, Idea encouragement and generation of new ideas, Implementation of new ideas, Potential problems in an innovation system, Identifying opportunities for improvement

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- Introduction to Innovation Management – German Presentation
- References
- Discussion Forum
- Chat Room

Figure 6: Online Course Attendance

*Company Level*

We have installed similar platforms and strategies in multinational organisations so that they configure the content with process and technology related skills sets and training materials. In the first run we use a combination of process assessment (weak processes areas) and the access to specific knowledge by training.

## 6. The Qualification Strategy

Nowadays it is important that training courses are really recognised and attendees receive a certificate valid for all European countries. As a backbone of the above described initiative the EU then supported the establishment of a **European Certification and Qualification Association (ECQA)**. This ECQA is the result of the former European Qualification Network EQN Leonardo networking project, 2005 – 2007.

The overall objective of the project has been to establish an **ECQA** ([www.ecqa.org](http://www.ecqa.org)) which supported by training organisations from European countries (currently organisations from 18 countries participate) installs a set of quality criteria and common certification rules which are applied across the different European regions in the Life Long Learning scope in the IT and services, engineering, and manufacturing sectors.

This results in a pool of professions in which a high level of European comparability has been achieved by a Europe wide agreed syllabus and skills set, a European test questions pool and European exam (computer automated by portals) systems, and a common set of certificate levels and a common process to issue certificates.

**Quality Criteria:** The partners collaborated on the development of the quality criteria comprising of: Quality criteria to accept new job roles in the ECQA, quality criteria to accredit training organisations and certify trainers promoted by ECQA, and quality criteria and test processes to certify attendees who have run through the raining of a specific job role.

**ECQA Certification Concept:** The partners elaborated the whole set of necessary concepts and legal structures to start ECQA. A founding conference at which 45 European training organisations from 18 countries have participated took place on 5 December 2006 in Krems (near Vienna), Austria. A second founding and Europe wide dissemination conference took place in Budapest, Hungary, on 16. October 2007. A third general assembly and valorisation conference took place on 3<sup>rd</sup> September 2008 in Dublin, Ireland.

ECQA certificates and exam portals are used by 18 countries applying the same quality criteria for training and certification Europe wide.

In the new EU Cert Campus project we will add learning portals to the infrastructure enabling a European virtual campus connected to the exam and certification initiative.

**European Exam Portal System:** The existing skills assessment portals (already used by approx. 4000 students in different learning initiatives) are extended to cover the new requirements of the ISO 17024 (General Requirements for Bodies operating Certification of Persons) standard. Especially the features how to run the tests have been improved. In 2009 already 15 European professions will be supported by the system. It is planned to support 20 EU professions from 2010.

The ISQI (International SW Quality Institute, [www.isqi.org](http://www.isqi.org)) is an ISO 17024 certified body which for some of the professions acts as the certifier on behalf of ECQA.

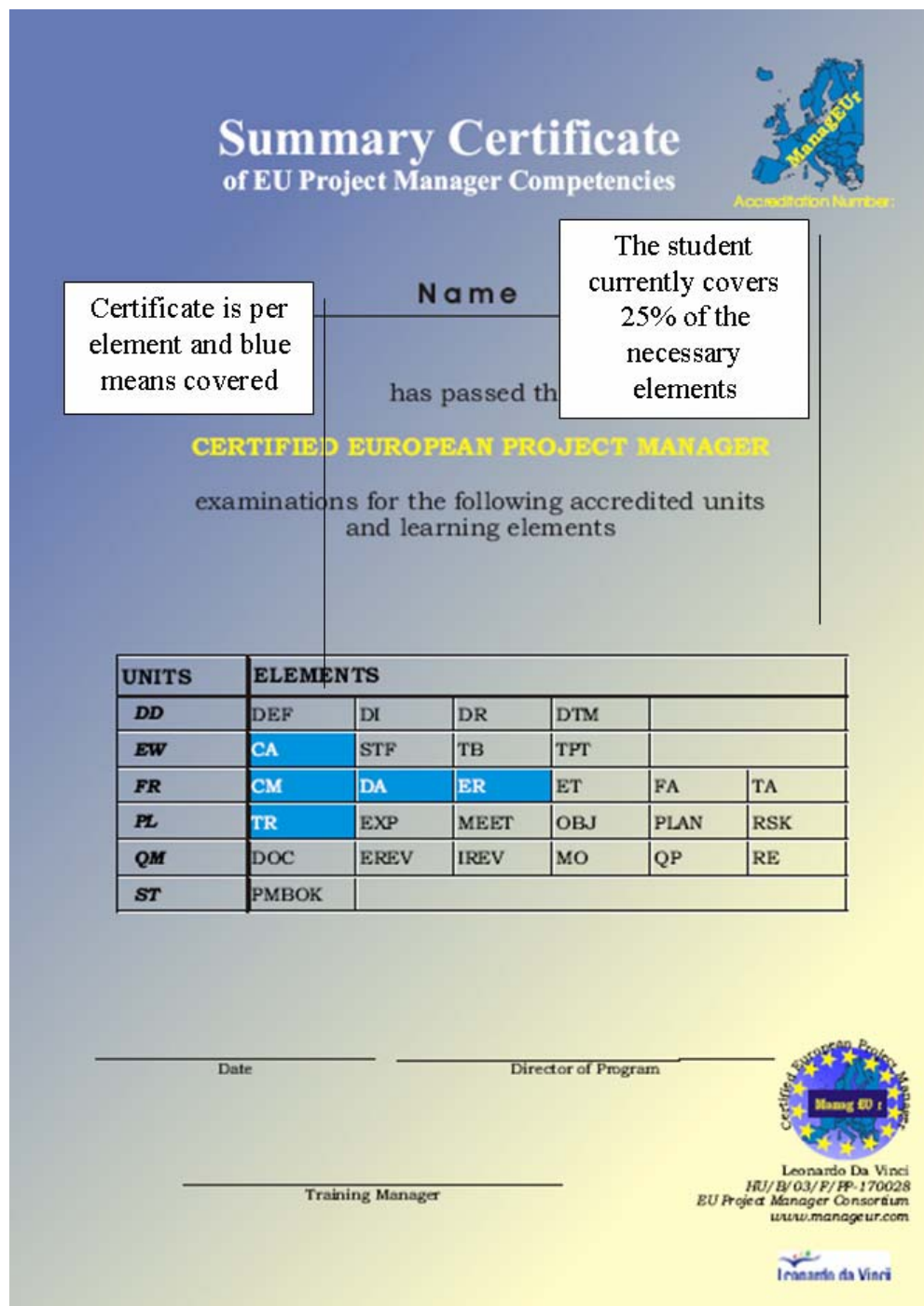


Figure 7: Example Certificate

The certificates are automatically generated by the system. This requires the participant to perform a computer based test.

## 7. The Platform Strategy – EU Certificates Campus

The system is based on an integration of the Capability Adviser System (Skills and Process Assessment) and learning platforms such as Moodle. The interfaces are managed via a defined interface database system.



The integration of both server systems is shown in Figure 5 and Figure 6. For the below professions with one account you can use both systems (skills portals + learning portals) –

- IT Consultant for SMEs
- Certified European Innovation Manager
- e-Business Manager
- e-Strategy Manager
- e-Security Manager
- EQ - Interpersonal Skills
- Certified Professional Skills
- SPI Manager
- IT Security Manager

See also [www.eu-certificates.org](http://www.eu-certificates.org) , section Learning Portals.

Students can follow the self assessment and learning guide

- [http://www.iscn.com/projects/piconew\\_skill\\_portal/images/eqn-users-self-assessment-learning-guide-v1.pdf](http://www.iscn.com/projects/piconew_skill_portal/images/eqn-users-self-assessment-learning-guide-v1.pdf)

and walk through the system.

However, as we are supporting a large multinational group learning servers have been set up and linked for other professions as well, who use the services but you need 2 accounts separately (one at the central skills portals, one at the decentralised learning portals).

This relates to professions, such as

- European Internal Financial Control Assessor Training
- European Project Manager
- Information and Communications Engineer
- Scope Manager

The system is being used by a Europe wide LLP project EU Cert Campus ([www.eu-certificates.org](http://www.eu-certificates.org)) and promoted by the ECQA ([www.ecqa.org](http://www.ecqa.org), European Certification and Qualification Association).

## 8. Outlook

The innovation studies illustrated that to make process improvement and innovation strategies successful we need to consider the human skills and team learning factors to a large extent. How quick we can roll out a good practice to all teams is decisive about the time to impact and the time to success.

Advanced firms (e.g. the 156 multinational companies in the Ted O`Keeffe study) understand the need of such systems and beside top management support count most on the supporting infrastructure of team learning and knowledge sharing and the creation of a positive learning culture.

In such an environment we can (1) build a critical mass of joint certificates in Europe , and (2) use the advanced learning systems to install supporting infrastructures in the European firms.

If you are a training organisation and want to be joining EU Certification and Qualification Association and want to find out synergy options, please search for [www.ecqa.org](http://www.ecqa.org) and contact one of the coordinators or Job Role Committee (JRC) representatives.

If you are a trainer and want to be trained as a trainer in one of the promoted professions, EU Cert campus will fund and sponsor your education. Please select the right job role and contact the JRC (Job Role Committee) representative to be included in the 2009 training of trainers program.

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### Dr Richard Messnarz

Dr. Richard Messnarz (rmess@iscn.com) is the Executive Director of ISCN LTD. He studied at the University of Technology Graz and he worked as a researcher and lecturer at this University from 1991 - 1996. In 2 European mobility projects (1993 and 1994) he was involved in the foundation of ISCN, and he became the director of ISCN in 1997. He is/has been the technical director of many European projects:

PICO - Process Improvement Combined Approach 1995 - 1998,

Bestregit - Best Regional Technology Transfer, 1996 - 1999,

TEAMWORK - Strategic Eworking Platform Development and Trial, 2001-2002,

MedialSF - Eworking of media organisation for strategic collaboration on EU integration, 2001-2002

He is the editor of a book "Better Software Practice for Business Benefit", which has been published by IEEE ([www.ieee.org](http://www.ieee.org)) in 1999 (the leading research publisher in the USA). He is the chairman of the EuroSPI initiative and chair of the programme committee of the EuroSPI conference series.

He is author of many publications in e-working and new methods of work in conferences of the European Commission (E-2001 in Venice, E-2002 in Prague), and in the magazine for software quality (Software Quality Professional) of the ASQ (American Society for Quality).

He is a lead ISO 15504 assessor. He has worked as a consultant for many automotive firms, such as BOSCH, ZF TE, ZF N, Continental TEMIC, Audi/VW, etc. He is a founding

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### **Dipl. Ing. Damjan Ekert**

Dipl. Ing. Damjan Ekert is the chief developer of the Capability Adviser and EPI / Learning systems since 2003. He studied Telematics in Austria and finished studies with distinction. He is a certified ISO 15504 assessor and works in consulting projects for Magna. He is the project leader for software development inside ISCN.



**Figure 8: EQN Founding Conference 2006**



**Figure 9: EQN Launch at EuroSPI 2007 & Conquest 2007 in Potsdam, Germany (350 attendees)**



Figure 10: SAP Key Note