Fostering the Estonian Software Engineering Skills Capital

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Why did we call for this forum?

“Lack of qualified IT professionals is a growing challenge for the sector […]
To ensure the development of innovative products and services, co-operation between research institutions and entrepreneurs needs to be intensified”

Estonian Information Society Strategy 2013

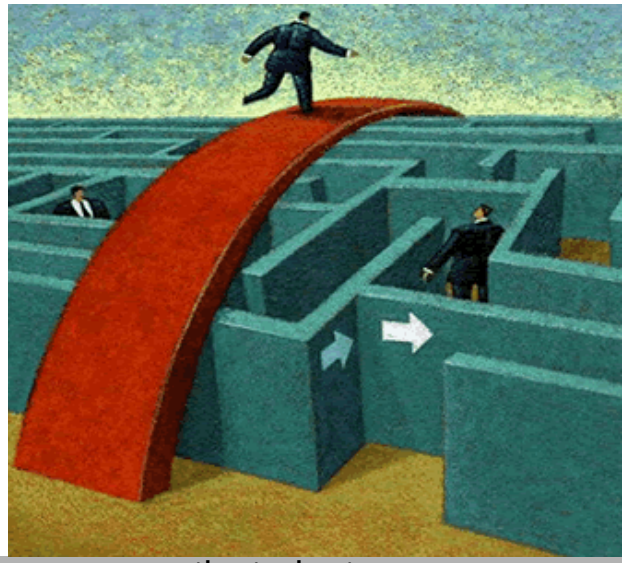
November 2006

Signs of IT Skills Shortage?

- Estonian ICT industry employs around 9000 people (generates approx. 9% of GDP)
- Approx. 480 graduates from IT higher-education institutes (roughly 10 PhDs, 120 Masters, 350 Bachelors based on estimates from 2006 data)
- Can sustain renewal but not significant growth…
- Students employed from 2nd year of studies
- Quality rather than quantity is the central issue…

Why is the IT skills shortage a problem?

- Top talent is attracted by:
  - Large local companies
  - Scandinavia and Western Europe
- Who will be the next Estonian IT entrepreneurs?
- Who will form the next generation of IT graduates?



www.motivatedentrepreneur.com

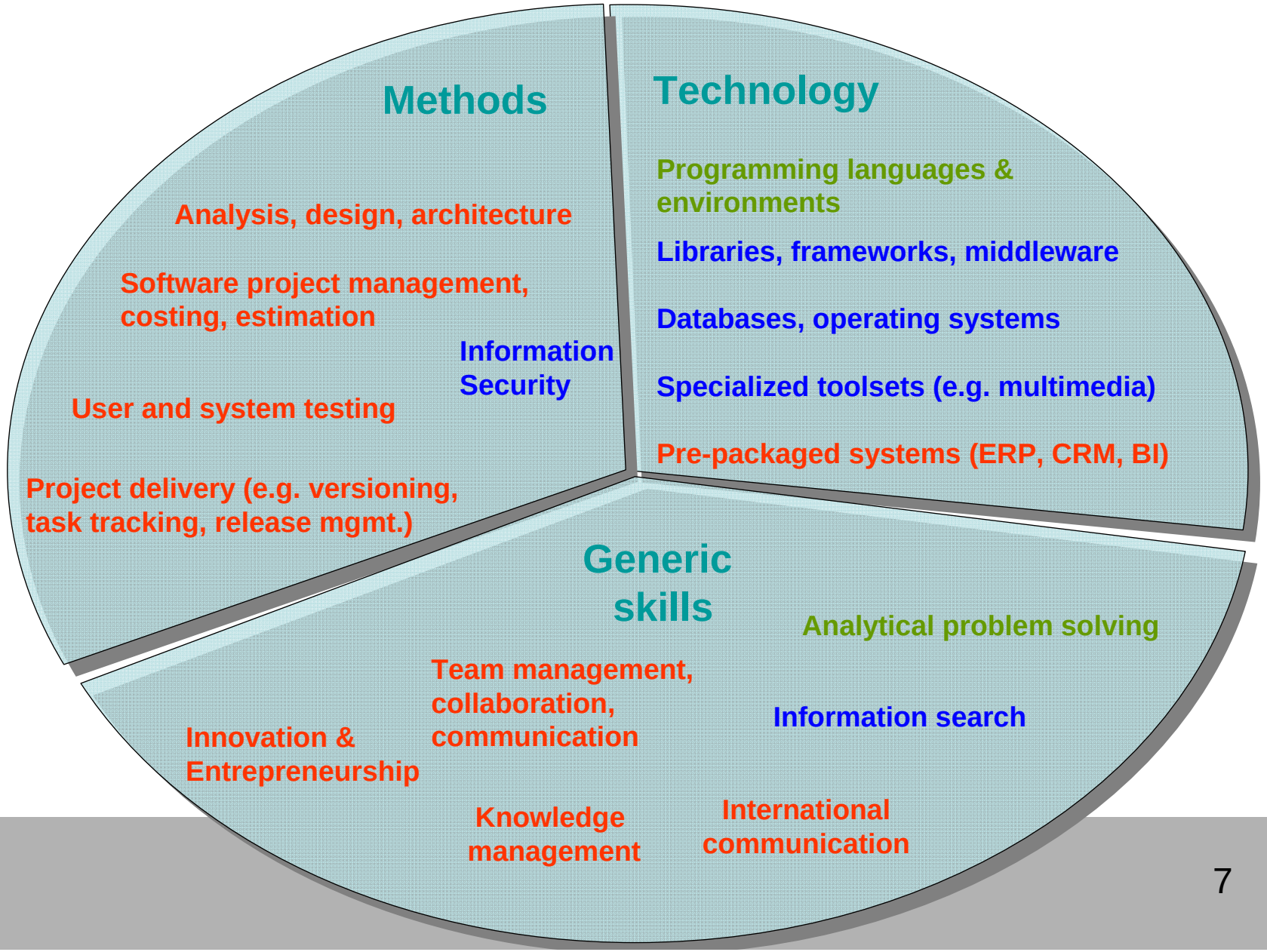
Software Engineering Education in Estonia: Issues

- No research group active in the field
- Few Master/PhD students → no staff renewal
- Industry filling the gap
  - 50% of SE-related courses at UT run by professionals in their spare time
  - Webmedia staff running software engineering labs and projects at TU & TUT; Skype staff helping ITK
  - Good in some ways, but is it sustainable?

Estonian SE Education: SWOT Analysis

Strengths	**Weaknesses**
Successful tissue of software companies High levels of ICT adoption Industry's willingness to collaborate with universities EU membership Geographical situation	Lack of academic capacity/renewal Limited pool of potential students Students absorbed by work duties Language barrier Estonia not highly visible internationally
Opportunities	**Threats**
Creating synergies between institutes Fostering international collaborations Attracting foreign students Attracting further EU projects	Software industry innovation fades down General slowdown in software industry Spiraling SE specialist hiring costs Students & graduates attracted abroad (brain drain)

Strengths/weaknesses by area



Case Study: Trento, Italy

- Rather small ICT department at University of Trento in the 90s with few pockets of excellence
- Early 2000s: Strong push from local government and industry to boost ICT higher education
  - Program for attracting “top” international professors
  - Creation of two international Master programs
  - Creation of an international ICT doctoral school
- In 2008
  - Number of students has nearly doubled in 5 years
  - Department is now aggressively marketing to India/China
  - External research funding increased by 50% in 5 years
  - April 2008: Trento’s ICT doctoral school opens 64 PhD positions

How to move forward?

- Focus: Which areas should the Estonian software industry & academia emphasise? E.g.
  - Embedded and mobile software applications
  - Business and e-Government software
  - Lightweight & agile software delivery
  - Secure software systems
  - Digital media & telco applications
- Collaborations
  - Industry-university
  - University-university

Industry-Academia Collaborations

- Industry-sponsored professorships
- Industry-sponsored Masters & PhD scholarships
- Guest lectures
- Internships
- Co-supervision of student software projects
- R&D collaborations (for larger companies)
- Continuous professional education initiatives

University-University Collaboration

- Estonia is too small to have institutes that compete among them (too little resources anyway)
- IT is global, our competitors are outside Estonia!
- Duplication of efforts is not viable!

IT-related Masters: Are there enough?

TUT

1. Master of Computer and Systems Engineering
2. Master of Informatics
3. Conversion Master of Informatics
4. Master of Telecommunication
5. Master of Business Information Technology
6. Master of Information Technology (in English)

UT

7. Master of Information Technology
8. Master of Computer Science

TLU

9. Master of Informatics (Multimedia and Learning Systems)
10. Master of Management of Information Technology
11. Master of Teacher of Computer Sciences, ICT Manager
12. Master of Interactive Media and Knowledge Environments

What about government?

- Government can complement industry contributions (e.g. jointly funded R&D projects and scholarships)
- Promote further collaboration between institutes and greater focus on priority areas
- Promote internationalisation
- Facilitating migration for non-EU students & lecturers
- Promote university-driven CPE and in-service training (täiendkoolitus)

Estonian ICT Industry & Academia Dilemma

Estonian ICT Industry & Academia Dilemma

Küsimused?
Arutelu