

Academic promotion and financing in the field of software engineering in a medium developed country



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Introduction



- **General characteristics of Software engineering (SE)**
 - Multidisciplinary field of investigation and study
 - Sharing features of technical / engineering field
 - Aim to create new values for the benefit of the stakeholders (individuals & society)
- Characteristics of SE in a medium developed country
- (e.g. Croatia)
 - Software engineers in **high demand**
 - **Well paid**
 - **Attracted** by highly developed countries
 - **Less developed countries face:**
 - competitive disadvantage
 - brain drain
 - chronic lack of expertise in a vibrant field
 - **Preventing them from narrowing the gap**

Higher education teaching staff in SE (1)

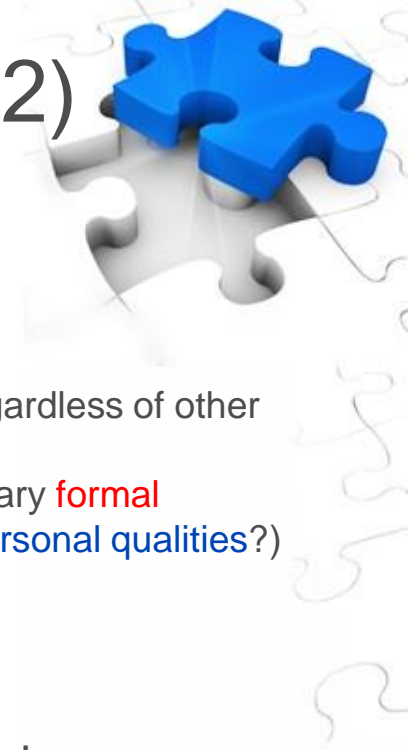


- Threat of **negative** selection due to

Recruiting policy

- Ministry of science, education and sports defines quotas
 - Not influenced enough by the market **demand** for SE
- Criteria
 - **Formal** achievements (average marks) prevail
 - Candidate's **personal qualities** are not considered

Higher education teaching staff in SE (2)



Promotion policy

- **Scientometric** indicators prevail
- If **quantitative** criteria satisfied, **promotion** becomes **compulsory**, regardless of other candidate's characteristics!
- A candidate can **sue** the elective committee if satisfying the necessary **formal** prescribed conditions and was not promoted (e.g. due to **lacking personal qualities**?)
- Practically **no influence** of other factors:
 - **Binary** influence of teaching quality
 - Positive result (>1) of students' enquiry is necessary for promotion/re-election
 - Quantity of teaching, attracting students
 - **No effect**
 - Projects, professional achievements, teamwork, social intelligence & skills, income to the faculty, ...
 - **Nearly no effect**

Higher education teaching staff in SE (3)



Rewarding

- Only the **formal** status counts (e.g. assistants, assistant professor, associate professor, full professor, full professor with tenure)
- **Salary** determined like it had been practiced long time ago (e.g. in Austrian – Hungarian Empire, for civil servants) – **Pay grades**
 - **Quality** of teaching
 - Result of students' enquiry $\varepsilon [2, 5]$ **necessary**
 - **No effect** on salary
 - **Quantity** of teaching
 - **No effect** on salary

Application of natural sciences criteria to SE (1)



- Natural sciences & Mathematics seem similar to the **technical** area
- The criteria for excellence and academic promotion copied from **natural sciences**
- Related fields, but are they identical?
- Paper in **natural sciences**:
 - Describes a case with sufficient information to be **REPEATED AND PROVED**
 - If accepted, other scientists **do not have** (for some time?) **to** harbour doubts and **repeat** the experiment – they can proceed further on

Application of natural sciences criteria to SE (2)



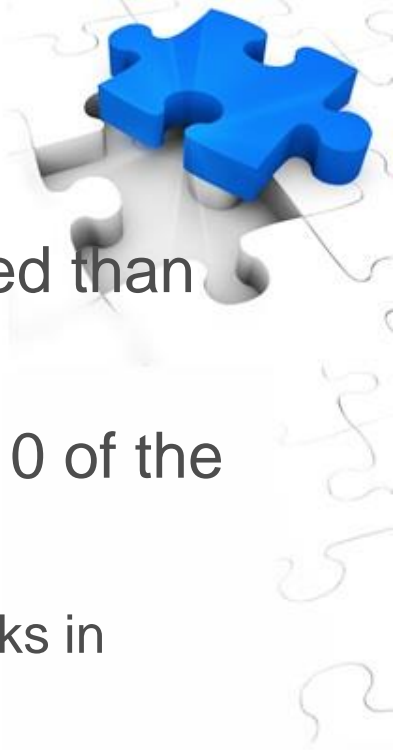
- Paper in **technical science**:
- It may, but **NEED NOT** correspond to that paradigm
- Can it be expected in SE that a described case with sufficient information can be **REPEATED AND PROVED**?
- Can the description of development of an **information system**, with valuable hints and recommendations be literally **repeated**?
- Is this paradigm **always** valid:
- *Scientists discover natural laws, engineers **use their findings** to apply them in order to produce added values.*
- Or perhaps **sometimes** this one:
- *Engineers **discover the possibilities to create added values**, research and experiment and achieve certain results. Scientist examine and research, motivated by engineers' results, and formulate natural science laws.*

What is first?

- Theory or practice?
 - Attempts to solve **practical problems** often trigger **research**
- Examples from history
 - Has Archimedes formulated his famous law **first**, and due to that he was engaged by the King to check the contents of gold in King's crown?
 - Or has he discovered his law due to **practical need** to solve a real-life problem?
 - The *Wright brothers* had addressed the *Smithsonian Institute* regarding the **physics of flying**. They had **no clue**. After the Wrights succeeded to fly, **aeronautics** has been established.



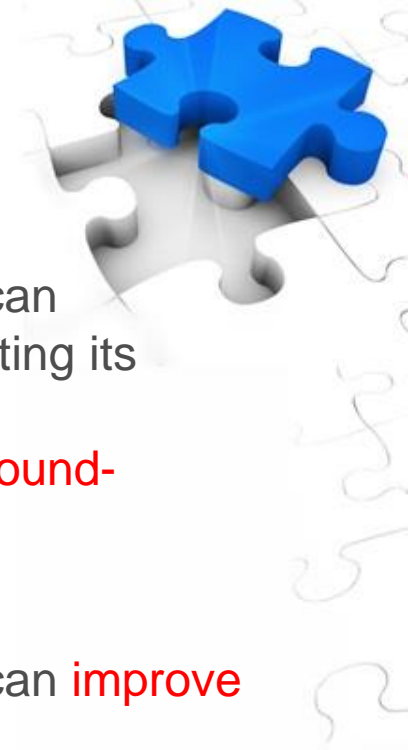
What is more relevant - abroad or at home?



- Achievements **abroad** are much more appreciated than those in Croatia.
 - The most-read Croatian daily newspaper listed 10 of the “Croatian most famous” scientists.
 - excellent scientists but **only one** of them lives and works in Croatia and earns money and pays taxes there.
 - For academic promotion, any achievement **abroad** is **more valued** than at home.
 - devised to prevent from corruptive promotions
- but also**
- remnant of tragic colonial mentality in Croatia, developed through centuries of foreign rule?

The effects of scientific research

- In a **highly** developed country
 - A scientific contribution in the field relevant for the country can **substantially improve** its economy, directly and/or by promoting its image worldwide
 - What is relevant for a highly developed country can be a **ground-breaking** and/or **disruptive** world scientific achievement
- In a **medium** developed country
 - A scientific contribution in the field relevant for the country can **improve** its economy,
 - It will probably **not** be regarded as a **ground-breaking** world scientific achievement
- In an **underdeveloped** country
 - If relevant worldwide, **hardly applicable** locally
 - Results accepted for publishing in an indexed journal may be **useful** for some better **developed** country



Related readings

- *Measuring research 'impact' for academic promotion: issues from the literature*

Kylie R. Smith, Ellie Crookes, Patrick A Crookes, Published 2013
DOI:10.1080/1360080X.2013.812173

<https://pdfs.semanticscholar.org/8a6d/fff952e13a2802b105492c1f6466c966687f.pdf>

(Accessed on November 6th, 2018)

- "The practice of restricting the assessment and evaluation of academic performance to **bibliometric indicators alone**, so as to produce a supposedly objective measurement of the quality of an institution, a scholar, a journal or an article, is **flawed** and potentially **damaging** for the equity of academic reward and evaluation."

How to finance the Higher education (1)?

- A fixed part – from the state budget
- A variable part
 - Variant a) From their alumni income taxes
 - Advantage:
 - Reflects the achieved effect on the country's prosperity
 - Disadvantages
 - Significant delay, so those who deserve it, may not get the reward
 - Complicated to implement



How to finance the Higher education (2)?

- **Variant b)** From state-provided **vouchers** of enrolled students
- Advantages:
 - **Simple** to implement
 - **Quick** feedback
- Disadvantages:
 - **Marketing** and **image**-building more important than real value



How to finance the Higher education (3)?

- In Croatia
 - The majority of stakeholders seem to **enjoy** the benefits for them in the current system 😞
- The system runs **better** than expected 😊
- Significant proportion of high **quality** staff still **present**?

If the current policies protract → **See the last slide!**



Loop of futility (**valid** maybe only in **Croatia**?)



- **Repeat** (*preferably forever*)
 - Choose an **irrelevant** niche of science
 - Find an obscure but **indexed** journal
 - **Publish** intensively
 - Get promoted due to **scientometric** indicators
 - Teach your **irrelevant** topics
 - **Free** from students, continue publishing
 - Recruit newcomers due to your **excellence**
 - Let your department **grow**
- **Until** someone **cuts** your financing