Success Factors in Industry-Academia Collaboration
-
An Empirical Study

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Software Engineering

Our objective:

SERL is focused on working together with its partners to create novel research solutions to real long-term industrial challenges.

This is our context when working with industry, but what are the key factors to have in place to be successful in this objective?

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Study objective

Given our strong focus on industrial collaboration, we wanted to know:

1. Success factors in industry-academia collaboration
2. Differences between different roles/groups
3. Any success factor that stands out

The study was run in two countries: Sweden and Australia.

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Swedish context

BESQ research project:

- Software engineering
- Six year project, 2002-2008
- 36 MSEK from research foundation
- Matching funds from industry (mostly in-kind); total volume of matching funds around 50 MSEK
- Project has primarily been run as a number of doctoral projects with different industrial partners
- Total number of researchers and PhD students: 15-18 people

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Companies

Research partners in BESQ:

- Ericsson
- UIQ Technology
- ABB Robotics and Sub-station Automation
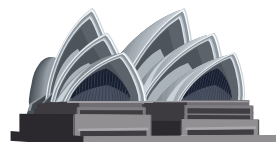- ABB Corporate Research
- Telenor
- DanaherMotion Särö

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Australian context

- More general, i.e. not within a project
- Primarily in information systems research
- Typical situation is data collection in industry and not long term collaboration

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Motivation of study

Starting point, we have a long collaboration behind us with several companies. We have had challenges and problems during the project, but also concrete positive impact. Thus, we would like to capture the experience and knowledge from the collaborative venture to be able to improve in the future.

Based on this, a study of success factors in the collaboration was designed.
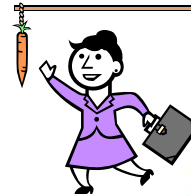
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Success factors identified

1. Champion at company
2. Champion's network within the company
3. Buy in and support from company management
4. Buy in and support from industry collaborators
5. Short term results and impact on industry
6. Organizational stability (industry partner)
7. Researcher has a visible presence in industry
8. Regular meetings
9. Relevant expertise of researcher (main person in the collaboration)
10. Attitude and social skills of researcher
11. Researcher's commitment to contribute to industry needs
12. Well-organized collaborative research project
13. Research environment at the university
14. Prior experience of industry-academia collaboration

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Design of study

- Survey sent to PhD students, senior researchers and people in industry
- The 14 success factors were prioritized using 1000 credits to assign to the factors, and hence we obtain a relative importance of the success factors
- Each respondent was allowed to also add any factor that he or she believed that we missed

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Respondents

- Ten doctoral students
- Six senior researchers
- 23 industry people, representing four companies
  - Two from company A
  - One from company B
  - 15 from company C
  - Five from company D

  Responses from companies studied to ensure that the dominance of company C does not affect the conclusions.

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Respondents

- 15 master and doctoral students
- 18 senior researchers
- 17 industry people

Students typically visited industry to collect data.

Note: The Australian study contained two additional factors: 15) trust and 16) short term effect and impact on university.

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Roles

- PhD students
  - One industrial PhD student: almost 100% presence at the company, employed at both at the university and in industry with the objective to conduct research
  - Nine PhD students employed by the university. They have full access to the companies, work space at the companies and are typically present at the companies 1-2 days per week.
- Senior researchers
  - Typically advisors that participate in meetings with industry regularly
- Industrial participants
  - Mixture of main contact persons, managers and collaborators

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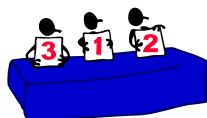# Results

Overall rank of success factors:

Top

1. Buy in and support from company management
2. Champion at company
3. Attitude and social skills of researcher

Bottom

12. Well-organized collaborative research project
13. Research environment at the university
14. Prior experience of industry-academia collaboration

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Results

Overall rank of success factors:

Top

1. Buy in and support from company management
2. Champion at company
2. Short term results and impact on industry

Bottom

14. Researcher has a visible presence in industry
15. Research environment at the university
16. Short term results and impact on university

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Different roles (top three)

PhD students:
1. Champion at company
2. Buy in and support from company management
3. Attitude and social skills of researcher

Senior researcher:
1. Champion at company
2. Attitude and social skills of researcher
3. Buy in and support from industry collaborators

Industry:
1. Buy in and support from company management
2. Champion at company
3. Researcher's commitment to contribute to industry needs

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Main differences (1)

PhD students and **seniors** believe that
- Champion's network within the company is more important than industry (diff. 5 in rank)

Seniors believe that
- Buy in and support from company management (diff. 7 (PhD students) and 8 (industry) in rank) is less important than PhD students and industry

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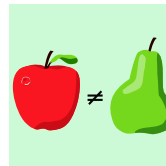BLEKINGE INSTITUTE OF TECHNOLOGY

Main differences (2)

PhD students believe that

- Short term results and impact on industry (diff. 5 in rank)
- Researcher's commitment to contribute to industry needs (diff. 4 (seniors) and 7 (industry) in rank)

is less important than seniors and industry.

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Academia vs. Industry

Academia believes

- Champion's network within the company (diff. 6 in rank)
- Buy in and support from industry collaborators (diff. 4 in rank)

are more important than industry.

Industry believes

- Researcher's commitment to contribute to industry needs (diff. 6 in rank)
- Buy in and support from company management (diff. 4 in rank)
- Researcher has a visible presence in industry (diff. 4 in rank)

are more important than academia.

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Statistical analysis: overall

We used the non-parametric Friedman test for k related samples.

Two criteria are significantly more important than the others:

- Champion at company
- Attitude and social skills of researcher

Two criteria are significantly less important than the others:

- Research environment at the university
- Prior experience of industry-academia collaboration
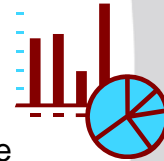
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Differences between roles

Significant differences (Kruskal-Wallis test) for three criteria:

- Researcher's commitment to contribute to industry needs (high rank)

grows in importance from PhD student to senior researcher and to industry.

- Research environment at the university (low rank)

decreases in importance from PhD student to senior researcher and to industry.

- Prior experience of industry-academia collaboration (low rank)

decreases in importance from senior researcher to PhD student and to industry

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Sweden and Australia

Sweden and Australia taken together in a statistical analysis:

More important by industry

- Buy in and support by company management

More important by academia:

- Relevant expertise of researcher
- Researcher's commitment to contribute to industry needs

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Differences

Swedish study, it may be noted that some factors are more valued:

- Researcher has a visible presence in industry
- Attitude and social skills of researcher

Not so surprising given the differences in context: long term collaboration vs. mostly data collection in industry

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Summary 1

Important differences exist in terms of perceived success factors for successful industry-academia collaboration.

The most important factors are:

- Buy in and support from company management
- Champion at company

Summary 2

The company side is most important in the collaboration, which most likely is due to that the researchers go into industry and not the other way around.

The actual research environment at the university is perceived as least important of the studied factors.

There are differences in views between different roles.

More details

Wohlin, C., Aurum, A., Angelis, L., Phillips, L., Dittrich, Y., Gorschek, T., Grahn, H., Henningsson, K., Kågström, S., Low, G., Rovegård, P., Tomaszewski, P, van Toorn, C. and Winter, J., "Success Factors Powering Industry-Academia Collaboration in Software Research", Submitted for publictaion (and available after acceptance).

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