INFORMATICS EUROPE

STRATEGIC GUIDANCE REPORT

Bridging Academia and Industry through BSc & MSc Theses



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Why joint theses matter

Joint bachelor and master theses are key instruments for innovation, talent development and knowledge transfer



University leadership

Set procedures, standard agreements and a single point of contact that make joint theses easy to start.



Industry stakeholders

Bring real problems, data and mentors, and gain early access to talent and state-of-the-art methods.



Regional ecosystem

Use thesis partnerships as seeds for research funding and stronger regional innovation ecosystems.

3 questions

1

Does your department offer Bs/Ms thesis in collaboration with industry?

2 **Benefit**

In your opinion, which is the most important benefit from this activity?

3 **Difficulty/ Drawback**

In your opinion, which is the main difficulty of this activity?

Three activities synthesised

Literature review

5 empirical studies, mostly on European software engineering

Interviews

3 universities, one 30-minute protocol, six question themes

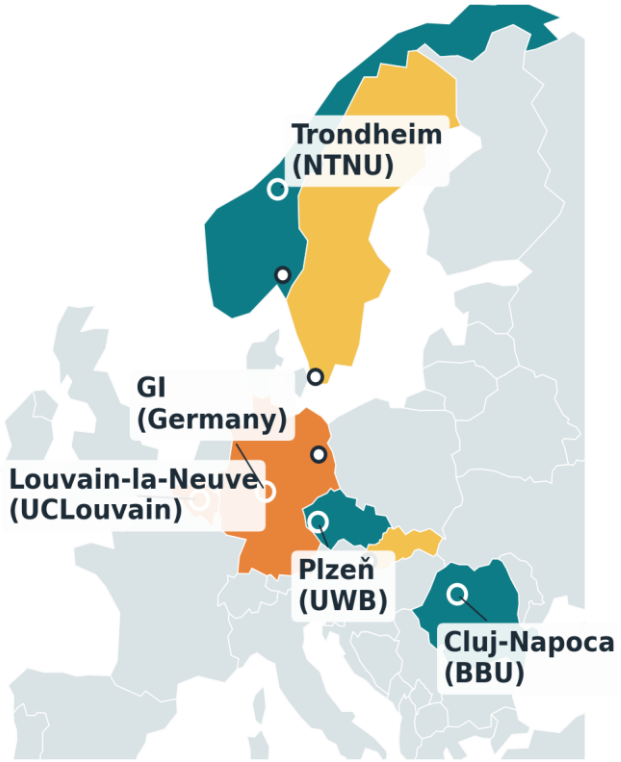
Case studies

UCLouvain master theses and the German GI recommendations

Synthesis

- Where practice reflects the recommended strategies
- Where collaborations struggle despite known best practice
- Opportunities for improvement

Where the evidence comes from



Interviews

Babeș-Bolyai University Cluj-Napoca (RO) · University of West Bohemia, Plzeň (CZ) · NTNU Trondheim (NO)

Case studies

UCLouvain – EPL school of engineering (BE) · Gesellschaft für Informatik (DE)

Literature

Simula & SINTEF (NO) · Comenius University (SK) · TU Berlin (DE) · Lund University (SE) · Univ. of South Australia

01

Literature review

What research says about the challenges and best practices of industry–academia collaboration



Five studies grounded in real-world collaboration

Ref.	Study	Focus	Key contribution
[1]	Marijan & Sen (2022), ACM TOSEM	Software engineering	Patterns and anti-patterns for co-creation
[2]	Marijan & Gotlieb (2021), IST	Software engineering	Certus 7-phase collaboration model
[3]	Evans, Miklosik & Du (2023), Heliyon	Digital transformation	Institutional, output, framework and relationship enablers
[4]	Jirapong, Cagarman & von Arnim (2021), Sustainability	University–start-up	Multi-channel collaboration for sustainability
[5]	Rico et al. (2021), JSEP	Software engineering	Communication as a core enabler

Not exhaustive: chosen to understand what makes thesis-level collaboration succeed.

Eight recurring challenges

Goal alignment & expectations

Rigour and novelty vs ready-to-integrate solutions

Timing

Academic deadlines vs industry time constraints

Commitment

A busy contact or disengaged student stalls work

Resource access

Data, equipment and compute are hard to unlock

Background

Quick fixes vs provably correct innovation

Scope & roles

Unclear scope; company interests can crowd out the student's

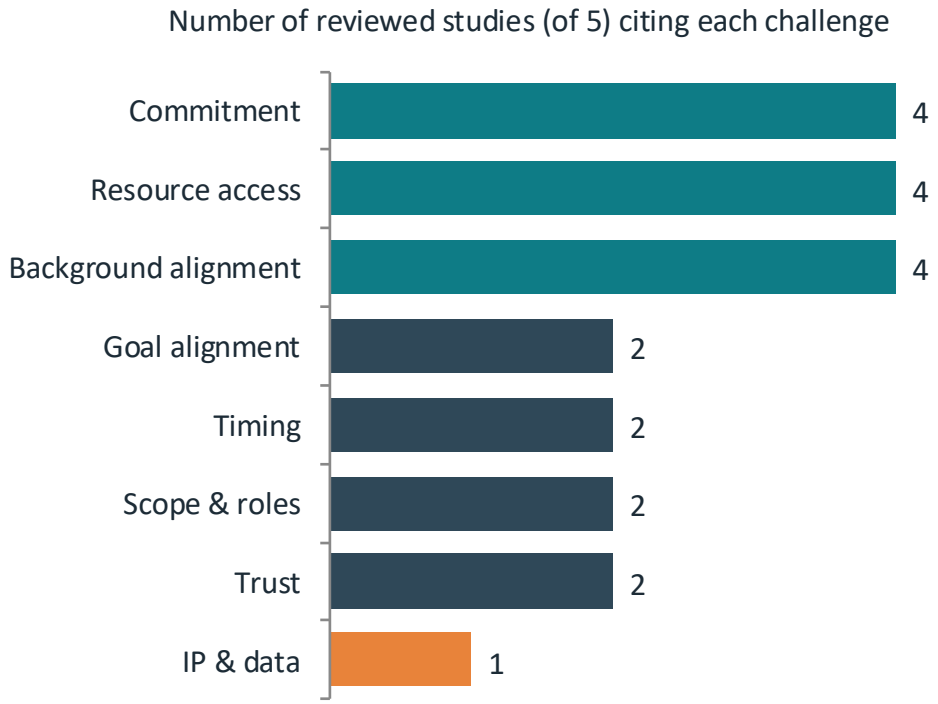
IP & data

Complex, and no one is keen to invest in it

Trust

Few key people, so personal trust is critical

Commitment, resources and background lead



4 of 5

studies flag commitment, resource access and background alignment

Only 1

study raises IP

Nine recommendations tailored to theses

1. **Formulate problems from industry needs**
   Intensive interaction; communication is key
2. **Establish a follow-up team**
   Student, advisor and industry collaborator
3. **Tune the effort**
   Decompose complex problems to fit the thesis timeframe
4. **Set measurable outcomes**
   Even for exploratory topics
5. **Prototype and test**
   Assess the prototype against the industrial problem
6. **Keep stable teams**
   Continuous collaboration across problems
7. **Formalise legal conditions early**
   IP, confidentiality, resources, schedule, insurance
8. **University manages formalities**
   Don’t burden industry partners
9. **Single point of contact**
   One entry point for companies and academics

02

Interviews

How three European universities run BSc/MSc theses with industry today



One protocol, three universities



30-min recorded interview → **Transcription by interviewer** → **Review & approval by interviewee**

Babeș-Bolyai University
Cluj-Napoca, Romania

University of West Bohemia
Plzeň, Czech Republic

NTNU
Trondheim, Norway

Q1 Topic selection
Who proposes; how students and coordinators are assigned

Q2 Company role
Coordination, resources, time on site, internships

Q3 Formalisation
Protocols, IP and NDAs

Q4 Evaluation
General vs industry-specific rules

Q5 Contacts
Attracting and motivating companies

Q6 Current situation
Procedures and share of theses

Babeș-Bolyai University

Cluj-Napoca, Romania

Assoc. prof. Dan Mircea Suciu

~25%

of MSc theses with industry; BSc cases are rare

Topic

Usually proposed by a company, sometimes by a student working there

Company role

Technical advisor; NDA when the student uses company space or data

Formalisation

Document signed by student, university and company coordinators

Evaluation

General rules; software development is mandatory in CS theses

Contacts

Local IT firms interested; no specific attraction strategy

Trend

Rose with the internship semester, dipped after the pandemic

University of West Bohemia

Plzeň, Czech Republic

Prof. Premek Brada

10–20%

of students choose a company thesis; 1–2% in research-oriented programmes

Topic database

Companies register topics; staff review before they go live

Liaison

Each partner company has an academic contact who shapes topics

Formalisation

“No robust process in place”; no three-party agreement yet

IP

Thesis is public and student-owned; transfers case by case

Evaluation

Independent reviewer, who may be a company specialist

Contacts

Official faculty partners preferred, to ensure quality

NTNU Trondheim

Trondheim, Norway

Prof. Letizia Jaccheri

~25%

of theses are in collaboration with industry partners

Topic portal

Academic staff post topics; an academic must supervise

Agreement

Standard collaboration agreement: company, student, professor

IP

Student owns copyright; can transfer to the university to negotiate

NDA

A procedure exists when the project needs it

Outreach

LinkedIn, campus invitations, regional industry events

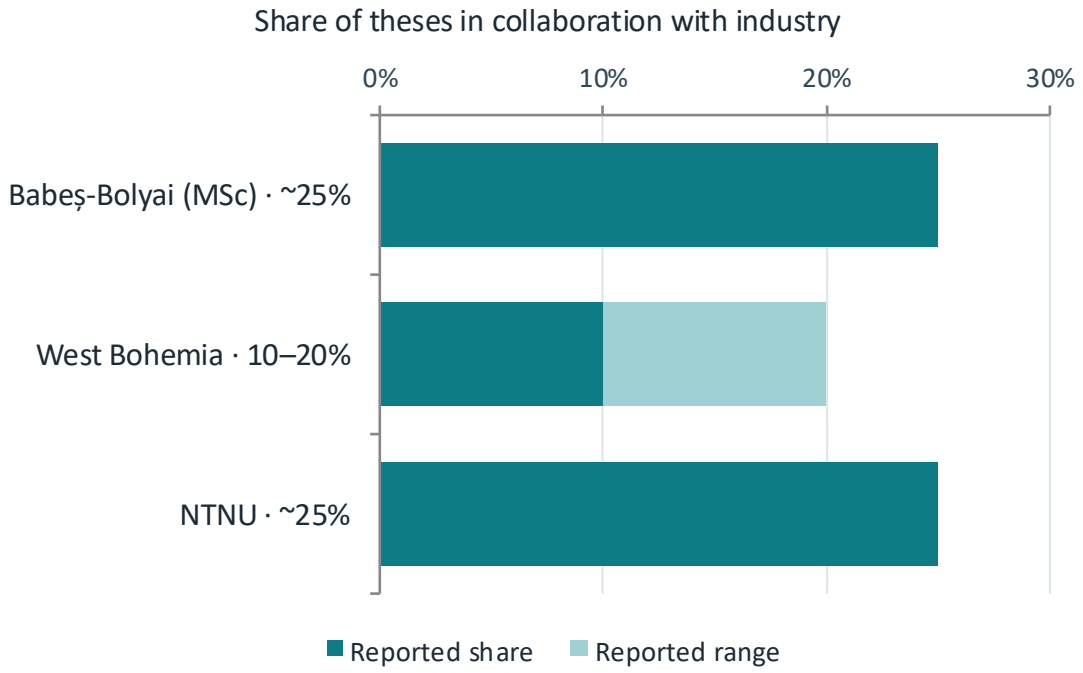
Challenge

Topic quality and moving firms toward research projects

Side by side: how the three universities compare

	Babeș-Bolyai	West Bohemia	NTNU
Topic source	Mostly companies	Company topic database, reviewed	Academic staff portal
Supervisor	Academic + company advisor	Academic + company advisor	Academic (or adjunct prof.)
Three-party agreement	**Yes**	**No (desirable)**	**Yes, standard**
IP owner	Student; thesis is public	Student; transfer case by case	Student; may transfer to university
Industry-specific evaluation	No	No; company reviewer possible	No; company evaluator possible
Link to internship	Separate activities	Separate activities	None

Roughly one in five theses involves industry



BSc theses with industry are rare at Babeș-Bolyai

Research-oriented programmes at West Bohemia drop to 1–2%

Most common in Software Engineering and Databases; very few in AI masters

Common ground across all three

Academic supervisor

Ensures academic standards, tracks progress and preserves scientific rigour

Uniform evaluation

Industry theses meet the same complexity, workload and scientific bar

IP is the main challenge

Student-owned by default everywhere; transfer handled case by case

Gap: prototype exploitation and legal conditions were not explicitly addressed by any interviewee.
Gap: Continuity relies on personal contacts, boosted by national or EU research funding.

The collaboration cycle in seven steps



A cycle, not a checklist

- Steps 1–4 happen when the topic is written
- Steps 5–6 run through the thesis year
- Step 7 secures IP, contracts and confidentiality, and makes the next round easier

Figure from the report

03

Case study

UCLouvain’s engineering school in Belgium and the German GI recommendations



UCLouvain: topics run through a professor



Company

Contacts a professor directly or at the matchmaking event

EPL professor

Agrees to co-supervise and posts the topic

1-page topic

Research question, technical needs, on-site presence

Students choose

3–5 preferences; must meet first-choice supervisor

Allocation

Maximise preferences; spread load across supervisors

Equal chances for every student

Companies have limited say over who is assigned: no selection on grades or merit, and no selective interviews.

Master thesis ≠ internship

Master thesis

- Obligatory for every Belgian master degree
- Original work with a research component
- Year-long, co-supervised by an EPL professor
- Part of the work may happen on site for resources; that is not an internship

≠

Internship

- Optional or mandatory depending on degree
- About 9 weeks working in the company
- Own, independent evaluation procedure
- Can be with the same company as the thesis

IP and confidentiality at UCLouvain

	Default	Possible exception
Ownership of results	Student owns all results, patentable or not	Transfer to university or company by contract, if the student accepts
Thesis text	Published openly once defended	Partially public, or under embargo
Defence	Public presentation	Jury only; jurors sign an NDA
Contracts	University standard contracts	Company's own IP documents, negotiated with research administration

The student must be told about any exception before choosing the thesis.

GI* guidelines: before, during and after the thesis

Before

- Cooperation or framework agreement: legal, confidentiality, liability, exploitation
- Work programme agreed by supervisor, company and student
- Data and tools provided early

During

- Regular meetings with the external supervisor
- Occasional joint meetings with the academic supervisor
- Adapt the work programme when the schedule slips

After

- External supervisor attends the final presentation
- Supervisor–company debrief on lessons learned
- Supervisor–student debrief on the experience

GI = Gesellschaft für Informatik e.V. (GI)
(German Informatics Society)

Don’t trap students between rigour and utility

Scientific rigour

Written thesis

Industrial utility

Working implementation



- Writing takes significant time, leaving less for implementation
- Balance both in the final assessment
- Not advisable to pay the student during the thesis
- Supervisors need access to all documents needed for evaluation

Does practice match the recommendations?

Recommendation	Interviews	UCLouvain	GI (Germany)
Problems from industry needs	Addressed	Addressed	Addressed
Follow-up team	Addressed	Addressed	Addressed
Tune the effort	Addressed	Addressed	Addressed
Measurable outcomes	Partly	Addressed	Addressed
Prototype & testing	Not covered	Addressed	Partly
Stable, continuous teams	Addressed	Not covered	Addressed
Formalise legal conditions	Partly	Addressed	Addressed
University manages formalities	Partly	Addressed	Addressed
Single point of contact	Partly	Addressed	Not covered

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addressed by all three sources: the topic-definition steps

Biggest gaps

- Prototype & testing
- Single point of contact
- Legal formalisation

SWOT: the system-level view

Does your benefit match Strengths or Opportunities?

S — Strengths

- Guidelines, protocols and standard IP documents exist
- Real-world use cases and industrial experience for students
- Mutual learning: talent for firms, insight for academics

W — Weaknesses

- Practical work may crowd out scientific investigation
- Low industry interest without immediate business outcome
- Topics too complex or too simple; IP negotiation

O — Opportunities

- Seeds for joint research funding proposals
- Stronger regional innovation ecosystems
- Better-prepared talent pipeline

T — Threats

- Students turn away from fundamental research topics
- Industry disengages if outcomes disappoint

Does your difficulty match Weaknesses or Threats ?

What each stakeholder can do next

Universities

- Name a single point of contact
- Offer standard three-party, IP and NDA templates
- Review topics for scope, effort and outcomes

Industry

- Co-define problems with an academic member
- Commit a mentor and resources for the full year
- Debrief and come back with the next topic

Funders

- Fund the follow-up research that thesis partnerships seed
- Support regional matchmaking events
- Reward long-term, stable teams

Success depends on coherent policies, structured procedures and sustained commitment from all stakeholders.

Call to action

If you are interested in extending and formalizing this work, contact us

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