On building a long-term university-industry collaboration

Ravi Shankar, Professor and Director, CSI, FAU
Raymond L. Barrett, Jr., PMTS, Maxim

Abstract

A smoothly functioning broad university-industry collaboration can pay dividends to both sides. However, typical collaborations are far more limited: a faculty member makes inroads with an industrial company and a stable collaboration evolves that is limited in scope to a specific area of research and practice. Potentially, however, by joining forces, both the university and the industrial company can tap into each others' intellectual assets for the better – and build an economic engine that not only provides grant support to professors, jobs to students, solves immediate design problems for the company, but also leads to innovation, and nucleates small businesses. Such collaboration provides increased revenue to the company and a pool of mature potential students to the university. Unfortunately, such a relationship is not easily evolved, especially when the goal is to achieve and sustain collaborative leadership for the long term.

The authors were involved as founders of the collaboration and have continued to study the outcome despite the industrial collaborator moving on to an unrelated environment.

After ten years of partial success, some setbacks or outright failures, and now, apparently success, we have experienced much in the art and science of collaborative endeavor. We present our experiences and lessons learnt.

Introduction

A close relationship between a high-tech industrial company and a proximate research-oriented university has long been perceived as potentially a contributor to establishment of a sustainable technology partnering. In contrast to a more distant relationship, contributions come from two major sources: the pool of specialist faculty members and the development of another pool of well-trained employed graduates. Too often though, such a geographically close relationship has been at arms length. Long-term university-industry collaboration has to be much more mutually synergistic. Given that technical challenges exist and motivate a relationship, new contrary dimensions also arise in the form of inter-institutional and cross-disciplinary environmental issues. These derive from disparities in each other's cultural framework and technical expertise at the institutional levels rather than the individual levels.

Each entity must fit successfully into the supply chain of the other. The university can supply both general knowledge and specialist individuals providing a global perspective.

The industry must guide the collaboration in a mutually beneficial manner to keep the effort focused on its internal industrial goals. A strong personal interaction should be built up, on both the sides, as between any two partners. One or more intermediaries who are fluent in both cultures and technologies are required as enablers. A participant from each environment forms topic-related partnership to gather personnel for working groups. The working groups meet to involve other personnel and form smaller task groups composed of collaborators and mentors from each organization. The hierarchical structure works well during the growth phase of the collaboration. As the collaboration matures, some groups wither, but others flourish for a number of reasons. We document our past experiences and its impact on a descendant of the founders' initial university-industrial collaboration that is organized around enhancing system design productivity.

Issues and Challenges

We categorize the challenges we experienced into three broad dimensions:

(1) Cultural irrelevance
- University publish or perish Vs Industrial proprietary secrecy;
- University process orientation Vs Industrial task orientation; and
- University Vs Industrial organizational structures.

(2) Discipline turf
- University hierarchical segmentation Vs Industrial organizational flattening;
- Communication style differences inter/intra organizations; and
- Compensation differences; and Accounting differences.

(3) Motivation
- University education pipeline Vs Industrial survival/productivity; and
- University theory Vs Industrial application.

Our ten-year collaboration has involved a consumer electronics company and a public university. During this period, the electronics company spanned major fluctuations in its fortune and product mix, while the university underwent a significant expansion in size and research expenditure. Financial and Research activities at the company became more short-term focused, while the university sought better accountability and became less flexible. These dynamics increased the risk of failure.

However, the relationship has stood the test of time and is moving towards a stable, longer-term, mutually beneficial alliance, thanks to the lessons learnt earlier and their utilization in the subsequent collaboration.

The Infrastructure

At the outset of our initial alliance ten years ago, we established a top-down council comprising of the leaders on both sides (Vice- President of the Company and Dean of the Engineering College) with 8 research committees representing the various interest groups on both sides of the aisle. There were a few enterprising intermediaries on each side who

met in the background to identify challenges and facilitate solutions. In the short run, this helped with the evolution/dissolution of topic groups, coalescing the infrastructure in specific domains for the conduct of synergistic activities, such as development of industry-oriented courses, admission of PhD candidates from the industry, procurement of federal research grants, and a build up of computing resources with modern industrial-strength engineering software tools at the university.

In the longer run, however, since such successes were not college-wide, the infrastructure for continued collaboration at the inter-institution level eventually collapsed. In the process, however, much was learnt from the successes and failures: Various misunderstandings existed about the intents and capabilities of the each side; Several individual intermediaries, seemingly by their very nature, sowed skepticism at higher levels and discontent at lower levels; and the relative successes caused political repercussions. Neither organization was organized as purely a meritocracy.

Out of the experience, we learnt a few critical lessons:

(1) Be an evangelist on your side for the other side's cultural and research priorities;
(2) Focus on the buy-in of the leaders and their councils on both the sides, both in terms of technical and financial aspects;
(3) Seek short-term wins on each side to overcome skepticism and enhance motivation;
(4) Communicate in several forms to reach the interested and inquisitive at all levels of the hierarchy; and
(5) Find ways to involve the younger members; they carry less intellectual baggage, are more up-to-date in technologies and methodologies, are more open to cross-disciplinary collaborations, and can exemplify successes of the alliance.

Our staged process is congruent with Kotter's principles of Leadership (Kotter, 1999):

(1) Establish a sense of urgency – even if it is a longer-term collaboration;
(2) Form a powerful guiding coalition – allow it to evolve over the mid-term;
(3) Create a vision – keep the message simple, relevant, and exciting;
(4) Communicate the vision – embed in each organization a microcosm of the other organization's environment;
(5) Empower others to act on the vision – find intermediaries who are knowledgeable of the other side to bridge the gap – we call such people 'evangelists';
(6) Plan for and create short-term wins – even if the goal is longer term;
(7) Consolidate improvements and produce still more change;
(8) Institutionalize new approaches; and
(9) Iterate, innovate, and invigorate.

Results

At our university, adherents are in the third year of consistent high level funding from the company. We have faced many technical and cultural challenges, but the adherence to the above frame of reference has given us unprecedented success, so much so that some in the

university believe that the company has ‘ear-marked’ the funds! That misunderstanding somewhat belittles the pro-active efforts of all the ‘evangelists,’ the intermediaries from both sides that have the technical and cultural competency and that have bridged the gaps and built the collaborative relationships.

For both partners, the collaboration has been successful in many respects. The university has benefited from:

- Large grants that support the collaborative research;
- Highly coveted design jobs for our students;
- Conference publications;
- New state-of-the-art courses using practical commercial tools;
- A collaborative management case study,
- Enthusiastic younger faculty partners; and
- A supportive college administration.

The company has benefited from:

- Several strategically executed short-term wins;
- A clear blue print for their technology future;
- An available hiring pool of well educated and well trained engineers; and
- Synergistic partnership with key software vendors (with university help)

Discussion

The collaboration, however, continues to pose challenges: The cultural gap is still difficult to overcome:

– A significant vocal minority continues to be somewhat obstructive, opposing the collaboration as service and training rather than research and education, and not appropriate in the mission of the university;
– Incentives for strong performers do not scale up;
– The project management role cannot be separated from the technical lead role because of the intense cultural gap;
– Senior members on both sides quite often cannot ‘mentor’ the collaboration, because of short-term goals and interest conflicts;
– Short-term Return on Investment (ROI) has been good for the company and the university – but long-term economic impact remains to be quantified;
– An intellectual property dilemma slows the publication of journal papers and tends to motivate faculty to focus on publishable aspects;
– The role of an evangelist to bridge the gap and harness synergies cannot currently be measured and gets somewhat ignored;
– Curriculum development must keep pace, so new students can be trained as earlier recruits get hired; and finally;
– Senior working engineers must be encouraged to enroll in such courses so the new found knowledge can gain exposure and credibility within the company.

Summary

In summary, we believe that a mutually beneficial long-term collaboration between a university and a company can evolve; but it needs strong and visionary leaders on both the sides to enhance communication and benefit. Evangelists are an absolute prerequisite to forge strong links on both sides and create a long-lasting infrastructure. Additionally, metrics and incentive structures that exist on both the sides must adapt to allow such evangelists to come forward and take risks.

Reference:

Kotter, J.P., John P Kotter on What Leaders Really Do, Harvard Business Review Book, Boston, MA, 1999.