

TWO CULTURES – JOINT SUCCESS

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ABSTRACT - For a future driven by technology and businesses built on knowledge and innovation, the role of R&D (Research and Development) between industry and academia plays a vital role in the way we do business. As a result, the function of project management in this area is of critical importance. Although inter industry-academia R&D is not a new concept, the guiding principles of project managing industry-academia R&D is by nature somewhat delicate and undefined. However, an organisation that has gained unique experience in this area is the Electric Power Engineering Centre (EPECentre). The EPECentre is an industry funded Centre of Excellence for electric power engineering, hosted within the University of Canterbury, in Christchurch. The experience of the EPECentre in R&D and lessons learned on the intricacies of inter industry-academia R&D project management has revealed 'insider' information on issues such as understanding cultural differences between industry and academia, allowing for contingency to operate in this environment, achieving realistic deliverables, etc., knowledge which could potentially add value to any organisation wishing to establish R&D links with academia and create win-win situations for both industry and academia – two cultures, joint success!

1. INTRODUCTION

The importance of inter academia industry collaboration is fast becoming a critical factor for the knowledge based economy of the future, particularly with respect to R&D (Research and Development). The need to develop and fine-tune techniques for cross cultural project management within this environment is also of growing importance.

One organisation that has been gaining experience in collaborative industry-academia R&D is the Electric Power Engineering Centre (EPECentre), which is a Centre of Excellence for electric power engineering, hosted within the University of Canterbury, in Christchurch. Since its establishment in 2002, the EPECentre has gone on to launch New Zealand's first industry-academia R&D programme for electric power engineering. This has resulted in a number of EPECentre driven industry-academia collaborative R&D projects.

Through its experience, the EPECentre has had the opportunity to discover many of the secrets of managing industry-academia R&D. From aspects such as industry-academia relationship building, awareness of cultural differences (academia vs. industry), meeting requirements, getting industry to understand the academic perspective and vice versa (e.g. balancing commercial sensitivities of industry with the publishing nature of academia, running projects at commercial pace, etc.), aiming for realistic R&D deliverables, managing risk, pitfalls to avoid, and the fun to be had.

2. PHILOSOPHY OF COLLABORATIVE R&D PROJECT MANAGEMENT

The philosophy of collaborative industry-academia R&D project management encompasses a wide range of issues, including the importance of recognising cultural differences (i.e. people are different), maintaining confidentiality (the secrets), the importance of publishing, realistic deliverables, allowing for contingencies, etc. Project Managers should be aware of these if they are to spearhead industry-academia R&D.

PEOPLE ARE DIFFERENT

One of the key success factors for any successful project is having a cohesive team that builds and enhances synergy. This, in the perspective of collaborative industry-academia R&D is a whole new ball game. No longer is it solely about a group of people in industry working together on a profit making venture for the benefit of its shareholders, nor is it about people in academia working together on high tech research within the protective bubble of a university. Therefore, it comes as no surprise that when the two cultures collide (i.e. academia and industry), so do its people.

The two cultures could not be any more different in their approach to R&D, but the value of tapping into the psyche of both cultures and combining the two in collaborative R&D is something that has benefits that far outweigh the difficulties of working together. Industry brings with it practical know how and professional business practice, while academia resonates the highest level of technical knowledge.

Academia's knowledge is gained through research and being up to speed with global trends in an area of specialisation. The medium for research includes a mixture of published journals, texts, professional memberships, committee representations, and conference attendance – all to an extent not (practically) possible for industry practitioners to achieve, due to the limited time constraints and (business) focus of industry.

In terms of R&D, industry sees itself as a well oiled 'wealth' creating machine that will do the minimum amount of R&D to achieve competitive advantage and maximum value for its shareholders. Whilst academia sees the pursuit of R&D as a means of furthering knowledge and simply, being creative or different. This can be summed up as little 'i' and big 'D' focus for industry, and big 'R' and little 'd' focus for academia. It is this critical difference that highlights the benefits of collaboration, where both big 'R' and big 'D' could be achieved. Hence, Project Managers should understand this key difference between the two cultures to make it work.

The key motivator for R&D from an industry point of view is commercialisation, which equates to patenting R&D outcomes, creating business opportunities, and targeting new markets, whilst from an academia perspective, this focus is more towards publishing and disseminating knowledge. Therefore, in broad terms, it could be described as a publishing versus patenting dynamic, which is possibly the biggest cultural difference between industry and academia.

The focus on publishing in academia is a result of the way academia is setup. The more publishing one does in academia, the more opportunity for career advancement and recognition amongst peers. In the point of view of industry, the commercial focus is a direct consequence of financial returns to the shareholder, which can potentially result in

a 'pat on the back' by Directors and/or CEOs, as well as career advancement opportunities for the individuals concerned. Therefore, it is apparent that although things seem different at first, one of the guiding motivations to succeed in R&D for both academia and industry tends to be somewhat personal in nature and entrepreneurial in spirit.

It is also important to note that not all academia is interested in working together with industry, and vice versa. In fact, only a minority of academics actually take special interest in working with industry on R&D. Most are focused on the core business of academia, which is research (without the development or commercial aspect), teaching, and university administration. As a result, most academics tend to have a 'hermit' mentality and do not subject themselves to much team work. For this reason, Project Managers must take great care to nurture existing relationships or to create new linkages with academia, i.e. industry-academia R&D is no easy simple task, and takes plenty of persistence, convincing, and time to get things moving.

WHAT ABOUT SECRETS?

A key issue that stumps collaborative industry-academia R&D is sharing secrets, and this is more so a concern for the industry partner(s) involved. Some common concerns tend to do with confidentiality - can academia really keep secrets? Will competitive advantage be lost? Will the competition find out? The way to overcome these concerns is to establish trust. In fact, the first challenge for any inter industry-academia R&D is to establish trust – no piece of paper alone will guarantee this, including contracts drafted by the best lawyers money can buy. Instead, it more or less comes down to relationship building and trust.

Experience has shown that team building is the way to achieve this trust, to enable industry and academia to work side by side. This takes a certain level of dedication and effort. This can be as simple as keeping people involved, e.g. inviting industry to academia events and vice versa. It seems apparent that people in academia and people in industry that rubbed shoulders together at joint events in the past, produce great team cohesion when put together on joint R&D projects – an unspoken mutual professional respect and trust seems to form through familiarity.

Therefore, if industry and academia were ever to work together on collaborative R&D, it will be the responsibility of Project Managers and leaders (both in industry and academia) to identify these opportunities early on and to ensure that the right people 'rub' shoulders before they will ever be required to work together – greater team cohesion will no doubt also reduce the risk of R&D. For example, if an industry organisation has an expert on a certain topic, and academia at the local university has a guru (or gurus) on the same topic, it would be most beneficial for both parties to make contact somewhere along the way, just in case of potential opportunities that may arise in the future.

Through careful relationship and team building, it is also possible for both sides to be somewhat satisfied. In the context of technology based R&D, this means that projects which are commerciality sensitive could still result in publishable material, as long as industry is open to the idea, i.e. respect academic freedom, and academia is smart in the

way it publishes findings, i.e. don't give away the secrets - it will be up to frontline Project Managers to balance their requirements.

DELIVERABLES & TIME FRAMES

Assuming that a certain project has been given the go ahead by its financiers (usually the industry partner or partners), the project will primarily be driven by academia, as they will be the people who will be responsible for undertaking most of the actual R&D. This requires plenty of commitment and time from the people in academia, and industry must be aware that this comes at a price.

Unlike the roles of people in industry, who may be assigned full-time to a certain project for a fixed time period or until completion, the few people in academia that pursue R&D do this activity over and above their usual workload, commitments, and duties. This means that the financiers should in practice be prepared to cover time spent by people from academia if they are required to dedicate a significant amount of their time (including personal time) and energy on a specific R&D project. With respect to this, one pitfall for Industry to avoid is the trap of being seen to exploit academia, as this can cause academia to distance itself even more from collaborative activity. Therefore, it will be the responsibility of Project Managers to look after the interest of both parties.

Good practice on collaborative projects is to buy-out academia time to get priority dedication for a project - much like a consultant would charge for billable hours and dedicate his or her time to a project for a fixed period of time. Once the people are appropriately remunerated, it is only then that the project can start making real progress, and pave the way for real world deliverables within set time frames at commercial pace.

However, Project Managers should always allow extra contingency and flexibility for deliverables and delivery dates when dealing with academia. A good set of KPIs (Key Performance Indicators) helps this process. The Project Managers should also discuss details of projects with concerned individuals from both academia and industry at the start of any project, preferably individually and also collectively. This will help academia open up to concerns, and vice versa for industry, especially when the teams consist of people that have not worked together before. It is also a good way to determine the needs and wants of both parties. In essence, a good R&D Project Manager should smooth and facilitate the transition process for the two cultures to work together at the start and throughout the project (and beyond).

Project Managers must also be aware that people in academia are restricted to what they can do at certain times of the year, especially during the Academic Teaching Year, when universities are in peak operation. The priority of academia will be towards this, not any extra curricular activity, such as R&D. Therefore it is best to schedule the bulk of R&D activity outside the Academic Teaching Year.

Consideration should also be placed on the potential use of students to expedite R&D activity. There are many opportunities for industry to establish small projects for students to work on, which are closely associated with larger longer term R&D projects, at significantly less cost, e.g. using scholarships as remuneration for students. However, it must be understood that expected R&D deliverables from student work also cannot be guaranteed, as the priority for students will be their academic degree programmes, not

small projects - unless extra care is taken to link their studies with associated R&D activity. However, on the plus side, it is also an opportunity for industry to test out new talent for future employment.

SETTING BUDGETS WITH CONTINGENCY

Budgets are always difficult in the case of R&D, however Project Managers must determine what is reasonable cost based on what they can estimate at the start of a project. To ensure that both academia and industry partners follow the same lines of thinking, it is important that the Project Manager has full control of the budget, mainly to guide expenditure appropriately when dealing with the two cultures.

For instance, industry would most likely want to focus a significant portion of funding towards patenting or conducting market research, whilst academia would see money spent on legal fees or market research as less important, and would prefer to focus the funds towards exploring or researching other related options to any one solution or innovation. Therefore, it will be up to the Project Managers to make certain that both parties understand the way forward and what is important for the benefit of the project. It all comes down to Project Managers ensuring that communication channels are kept open throughout a project.

In terms of funding, there are many schemes available in New Zealand that will assist with R&D, from matched funding right through to large scale grants and consortia. However, instigators of R&D activity should be warned that Government funding has a one size fits all approach, and criteria for eligibility is sometimes likely to be too specific in lot of cases to support the variety of R&D possible. The final say is left to the discretion and the mandate of portfolio managers in government.

For budgeting purposes on collaborative R&D, it is advisable to allow for a contingency of 10% - 15%, to protect against the unknowns associated with R&D, while project management costs are typically 5% - 10%, dependent on the size of the project. In addition, funds must also be allocated to cover overheads relating to academia for such items as Public Liability / Professional Indemnity cover, administration, equipment usage, electricity, printing, phone calls, etc.

Furthermore, it is important to note that in most cases, the legal activity and financial processing / billing for projects will be handled by the commercial arm of a university, as they carry the insurance cover for personnel in academia. Therefore, it is an absolute must that Project Managers are involved or at least aware of the processes involved, both on the academia side and the industry side to determine responsibilities and accountabilities, especially when funds are being processed or transferred.

FINDING FUN AMONGST IT ALL

Conducting collaborative industry-academia R&D can produce incredible results and it can also be a lot of fun as well as be challenging for all those involved. It is after all a mechanism for putting the best minds in academia with the best practitioners in industry, in the pursuit of entrepreneurial discovery. Moreover, industry can greatly benefit from the utilisation of in-depth advance knowledge in their area of operations, whilst giving

academia the opportunity to narrow or widen its scope towards researching areas that will be more beneficial to industry, and the greater economy as a whole.

Furthermore, academia also gets an opportunity to publish and enhance their knowledge, while industry gets an opportunity to create wealth for its shareholders through the creation of new business opportunities.

One of the most satisfying elements of industry-academia R&D is the opportunity to make a difference (e.g. a new product or service that could potentially add value and reduce cost, be more efficient, safer on the environment, etc.), together with the fulfilment of creating something based on an idea or concept. All this is made possible through industry-academia collaboration and as a direct consequence of combining the two cultures to achieve big 'R' and big 'D'.

3. DISCUSSION & APPLIED CASE STUDY

Many of the aspects of industry-academia collaborative R&D discussed could in theory be applied to a wide range of projects. The principles are much the same, irrespective of technical discipline, whether it is in telecommunications, pharmaceuticals or electric power engineering, to name a few. Therefore, the unique experience of the EPECentre gained through managing industry-academia collaborative R&D, in the electric power engineering area, should provide insight for any organisation wishing to create R&D links with academia.

In terms of understanding the cultural differences and meeting each side's requirements, the EPECentre takes great care and attention when establishing R&D projects to develop clear and flexible project plans, with input from both academia and industry partners. It also goes about establishing KPIs to monitor the outcomes of the project, with set timelines and deliverables. This is produced in accordance with the Academic Calendar of the University of Canterbury, to ensure that there are no clashes between the commitments of academia and the timelines of the project. Further care is also taken to ensure that academia is remunerated appropriately (at industry rates), and understands the requirements of industry, especially with respect to the importance of meeting deadlines and producing results, as well as keeping communication channels open during the duration of the project.

The EPECentre also facilitates the process of conference / journal publications to disseminate knowledge gained through projects as a way of satisfying the requirements of academia, whilst conducting market research and/or creating business plans to look for patenting or commercialisation opportunities to satisfy industry. Students are also incorporated into projects wherever possible and usually rewarded through scholarships. As a result, many students have gone on to receive multiple job offers by industry partners involved in R&D activity.

In terms of public sector funding, government agencies in New Zealand do not have funding schemes for specific electrical energy related R&D, therefore in the case of the EPECentre, direct government funding is never an option. The government views R&D in electrical energy as the problem of the power industry, irrespective of how important energy supply is to the nation, as recent media coverage has shown on issues relating

to security of supply / reliability, and future grid investment. The government appears to have no interest in supporting R&D in this very critical area.

Although not all projects result in success due to the inherent nature of R&D, the lessons learned by the people involved from both academia and industry are priceless. The opportunity to work together is seen partly as a relationship building exercise by both sides, and many tend to look long-term towards other collaborative opportunities in the future. The EPECentre facilitates this process through the involvement of industry at academia events, and vice versa, where many networking opportunities develop for future R&D.

Some of the collaborative industry-academia R&D project managed by the EPECentre includes the development of the world's first partial-core superconducting transformer with Meridian Energy Ltd., R&D into fluorescent light flicker with Orion NZ Ltd, renewable energy R&D with Antarctica NZ Ltd., development of an energy management system for AC Consulting Group Ltd., research into alternative generation methods for the Centre for Advanced Engineering Ltd., etc.

4. CONCLUSION

The importance of nurturing collaborative industry-academia R&D is not as straightforward as one might expect. It takes great care and understanding by R&D Project Managers to consolidate the two spatially different entities (academia and industry) to achieve the synergistic benefits of collaboration.

To emphasise this requirement, the experience of the EPECentre on collaborative R&D has highlighted the need for Project Managers to develop an understanding for cultural differences between industry and academia, the need for contingency to operate in this environment, as well as establishing the platform for setting realistic deliverables, all in the aim of creating win-win situations for both industry and academia.

Ultimately, the popularity and growth of collaborative industry-academia R&D is a certainty in New Zealand and globally. As more and more nations strive towards predominantly knowledge based economies, it will be up to the frontline R&D Project Managers of the here and now to make this future a reality – two cultures, joint success!

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For further information on the EPECentre and its R&D activity, visit www.epecentre.ac.nz