Best Practices and Strategies for Collaboration
Between Industry and Academia

Ms. Adarsh Pawaiya*
adapawaiya@gmail.com
810324450
ABV-IIITM,Gwalior

Mr. Ankur Ratwaya**
ankur.ratwaya@gmail.com
8817769343
ABV-IIITM,Gwalior

Mr. Ribhanshu Raj***
ribhanshu.raj1986@gmail.com
9691648599
ABV-IIITM,Gwalior

Introduction
The collaboration between industry and the academic world has always been an important but complex topic. Due to the rapid evolution of the business environment and the vast transformations throughout the academic realm, the subject is now even “hotter” than it has been. It’s a mutual approach, the companies offer business insights and the students contribute proven methodology and expertise. It is a win-win situation for both parties.

However, since the universities and industrial companies have different business models, some investment needs to be made to converge the two positions before the mutual benefits can be reaped. Universities focus on educating people and in creating new knowledge and excelling in existing know-how, while companies concentrate on mastering the challenges of a competitive environment and are striving for market success.

Obviously the core interest of both differs. When they collaborate, each party has certain expectations of the other side the companies expect innovative and state-of-the-art lectures to secure high quality education, valuable knowledge and groundbreaking methodologies, while the universities expect their students to be given business experience e.g. through internships and opportunities to put their skills into practice. The academics also expect to be given the opportunity to transfer theoretical ideas into practical projects and to implement research in the real world. Both parties have fundamental points of interest and this is where a win-win situation is achieved for both of them. With students being well educated in new methodologies and the corporate experts transferring these innovations into practical projects which involve the students, we will soon be able to see how the collaboration can bring about mutual advantages.
Companies which do not have a close relationship to the academic community are expected to advance slower. They miss out on early access to the latest research results and methodologies and then need more time to put these methods into practice. By being out of touch with a university, its students and young professionals, they become less attractive as prospective employers and often find it more challenging to recruit graduates and commit them for their first 2-3 professional years. Effective collaboration between academics and companies is critical for management research. It can inspire research topics that are relevant to business and encourage implementation of research findings. However, conducting collaborative research is not always easy.

**Challenges to Collaboration and Solutions for Solving Them**

The collaboration faces many challenges:-

**a. Different incentives**

Academics seek data for publication and funding to support their research. Corporate motives can vary by company and by person and include philanthropy, brand recognition, access to new technology or information, student recruiting and relationship building with a specific researcher.

Collaborators should clarify their motives early and ensure they understand what their potential partner is seeking from the project. Failure to align these interests can cause the relationship to fail or even prevent the collaboration from launching. For example, a manager seeking brand recognition will not likely be motivated by promises of access to the latest technology. Pitching a benefit that doesn’t align with the corporation’s interests could dissuade them from engaging.

**b. Different ideas of deliverables**

Companies are accustomed to dealing with consultants, hired to solve a company-specific problem and committed to providing a pre-determined product. These products are typically concise, highly visual and can be quickly applied to decision-making. When working with consultants, companies also own all intellectual property arising from the work.

**c. Written agreements**

Reaching consensus on written agreements, including contracts and MOUs, takes time and compromise. Crafting any agreement should start with a solid understanding of all parties’ concerns.
and expectations. After all, an MOU is a memorandum of understanding. Legal departments should also be consulted early on. This will allow identification and mitigation of potential legal concerns.

When developing MOUs and contracts, less is more. Crafting broad, high-level agreements can provide room for flexibility as projects evolve, reducing the need for changes or new agreements. This saves time and frustration for all involved.

d. Perceptions of pace

The research team and participating companies can perceive project pacing very differently. “In the early stages, researchers really want to get rolling with a project, but it takes times time for companies to move things up through the appropriate channels.

Partners should explain how processes work in their organization and give expected timelines for each part of the project.

e. Risk associated with a single corporate contact

Allowing one person to be a researcher’s only contact within a company exposes a project to risk. If the contact leaves, the researcher could lose the support of the institution and the collaboration may end. At a minimum, the researcher will have to invest considerable time selling the project to someone new. If the contact’s motives for collaborating were individual and not organizational, it may be very difficult to move forward.

f. Building relationships takes time

Developing and managing research partnerships takes time and skills that aren’t always easy to find. To progress from reaching out to companies, to getting them excited about the project, to completing written agreements, can take many months.

Keys for the Collaboration Success

1. Define the project’s strategic context as part of the selection process.

Use the company research portfolio to determine collaboration opportunities. Define specific collaboration outputs that can provide value to the company. Identify internal users of this output at the working level; executive champions are not a substitute for this requirement.
2. Select boundary-spanning project managers with three key attributes:
In-depth knowledge of the technology needs in the field is required. The inclination to network across functional and organizational boundaries is necessary. The ability to make connections between research and opportunities for product applications.

3. Share with the university team the vision of how the collaboration can help the company.
Select researchers who will understand company practices and technology goals. Ensure that the university team appreciates the project’s strategic context.

4. Invest in long-term relationships.
Plan multiyear collaboration time frames. Cultivate relationships with target university researchers, even if research is not directly supported.

5. Establish strong communication linkage with the university team.
Conduct face-to-face meetings on a regular basis. Develop an overall communication routine to supplement the meetings. Encourage extended personnel exchange, both company to university and university to company.

6. Build broad awareness of the project within the company.
Promote university team interactions with different functional areas within the company. Promote feedback to the university team on project alignment with company needs.

7. Support the work internally both during the contract and after, until the research can be exploited.
Provide appropriate internal support for technical and management oversight. Include accountability for company uptake of research results as part of the project manager role.

Best Practices for Industry-University Collaboration
The best practices for the industry academia relationship are:-
1. Define the project’s strategic context as part of the selection process

Industry-university collaborations must be aligned with the company’s research and development strategy and address a tangible need of the company. If not, there is high risk of investing in projects that have little or no impact. One senior technology manager stated: “Ensure that there is a tight link between the current commercial strategy and the research collaboration. The point is that there should be a vision within the company about what the university project will provide to the company. University research that lacks both a link to the company’s R&D portfolio and a company unit that cares about the result is unlikely to be given enough attention to prove useful.

2. Select boundary-spanning project managers

In every organization, there are certain individuals who naturally engage in networking activities, maintaining relationships that cross organizational lines. These boundary spanners are the main conduits by which knowledge is acquired from external sources and disseminated inside the organization, and they play an essential role in how any organization benefits from and adapts to its environment. Companies dependent on new technology rely on a particular type of boundary spanner the technical boundary spanner to capture and use this technology successfully. Effective technical boundary spanners, whether as a result of personality or training, recognize their responsibility to facilitate knowledge exchange with both the university research group and within their company. They are key to turning collaboration research outcomes into company impacts.

3. Invest in long-term relationships

Industry and academia do research on markedly different time frames. Industry is driven by economic and product cycles, while academic research project duration depends largely on the time required for a graduate degree program (a year and a half to two years for a master’s degree, three to four years for a doctorate). Both parties thus need to be upfront, and realistic, about their time expectations. The creation of multiyear collaboration programs addresses this mismatch and improves the chance of a successful research outcome.

4. Establish strong communication linkage with the university team

It is beneficial to have the university researchers visit the company and interact with company personnel. The more often these visits occur, the better the outcome and impact of the project. Such visits can facilitate the creation of strong personal relationships. Personal interactions are also crucial
in the transmission of unwritten tacit knowledge such as details of design or development practices. Regular meetings at the company thus foster the success of the collaboration.

5. Build broad awareness of the project within the company
Contact between university researchers and individuals in the company over and above the project manager increased the research’s impact for the company. University researchers who were introduced to professionals from different functional areas (for example, manufacturing, product development or sales) were able to share methods, lessons or discoveries on a broad front. As a result of this wider awareness, the university team received useful suggestions from other company perspectives than that of the project manager’s group.

6. Support the work internally both during the contract and after, until the research can be exploited

Successful management of industry-university collaborations implies a wider view than deliverables and contract fulfillment, because creating and sustaining a peer-to-peer relationship is central to success. Strong personal relationships serve as a catalyst for increasing knowledge flows. If these exist, people are more willing to invest time and effort in communicating knowledge to others. To incentivize and enable such investment, company project managers need to provide appropriate internal support for their work in the collaboration. The amounts quoted vary, but one general rule mentioned was that for every dollar spent outside, the company should devote a dollar inside.

Factors Affecting the Collaboration’s Impact
Several factors widely thought to be important to industry-university collaborations in fact had little effect on the projects’ business impact.

Although a powerful ally in the executive suite can help obtain support for a project, we did not find a correlation between the existence of such a champion and project impact. To deliver value, the key is whether the project addresses a real need, as perceived by working engineers in the company.

b. Geographic proximity.
Companies scouted for collaborators worldwide and were able to bridge geographic distance through visits, personnel exchanges and student internships. The important factor is not proximity but personal interaction between the academic research team and the company.

c. Overall project cost:-
The time frame of the project, not the amount of funding, is important.

d. Type of research basic, applied or advanced development.
There was no statistically significant difference in terms of impact between projects with different missions. The most important is that the projects address a tangible need for the company.

e. Location of project manager:-
There is no evidence that the location of the project manager, whether at a central laboratory or a business unit, affects project impact.

Academic-industry Types
The academic institutions and corporations have forged a variety of partnerships, the most popular of which include:-

a. Classroom and curricula activities such as corporate-sponsored design studios, corporate supported capstone projects, as well as courses, lectures and panel discussions taught by visiting professionals.

b. Short-term intensive design workshops such as week-long design clinics or multiweek summer workshops that are taught by design professionals in either campus or professional design studio settings with a focus on real-world design issues.

c. Design competitions with a focus on key challenges in design practice, where project topics and awards are sponsored by a professional design organization.

d. Student and faculty on-site opportunities including tours of design studios and manufacturing facilities.

e. Employment opportunities including summer internships, more intensive co-opositions and other work-study opportunities for students, faculty and alumni;
f. Corporate-sponsored research projects where professors and students, who have more time and freedom to research, can explore topics that are applicable to the sponsor’s core competency;

g. Professional conferences and community organizations designed to create knowledge exchange and networking between practitioners, educators and/or students;

h. Presenting and publishing new methods and research at conferences or in textbooks, journals and other relevant publications.

i. Corporate grants and philanthropic donations, which enable universities to direct funds where they see fit and which provide companies with strong public relations stories.

j. Advisory boards that enable academic institutions to receive direction on program and curricula development from industry leaders and/or practicing alumni; and also in the reverse, advisory boards where academic leaders offer visionary input on future research and development opportunities.

k. Liaison offices, which ensure that connections between corporations and educators are created, maintained and grown.

Guidelines for the Academia-Industry Interaction
The guidelines have to be set for the academic, industry and the academic-industry.

For the Academic Community

Bring the real world into the classroom or take the classroom into the real world.
Theoretical knowledge like design philosophy, design thinking, methodological approaches and social and ecological responsibility are undeniably core to design education. But, the practice of design in real-world contexts rife with demanding clients, ambiguity, complexity and constraints is equally important. Incorporate real projects with real clients into the curriculum. It is within these settings that students hone their professional skills of observation, organization, prioritization, business justification, and communication. It is here where designers master design thinking, making and doing.

Require international studies.
Given the inevitable forces of globalization, worldwide population growth and emerging markets, designers must have international experience.

**Explore new research opportunities.**
Much of the research in design is centered on new user observation/testing methods, new design processes and new product or service experiences. Given the impending shifts in the workforce, there is great opportunity to research new approaches to creative leadership and management and new methodologies and tools for enabling effective geographically distributed collaborative design activities.

**Influence other academic communities.**
While interdepartmental research is an obvious answer, broader and deeper opportunities should be sought. In most academic environments, each department has its own building, hallway, lab or space in which to operate.

**For The Industry**
**Offer more of the work opportunities that students and professors seek.**
While educators and students are encouraged, even expected, to engage with corporations, none of these efforts can be successful if the internships, apprenticeships, industry sabbaticals and research grants do not exist.

**Build deeper relationships with students.**
Beyond classroom instruction, there are a variety of opportunities to engage students more deeply. Build a presence on campus through activities such as information sessions, portfolio reviews, interviewing and mentorship.

**For Academia & Industry Together**
**Expand the collaboration.**
While academia and industry alone can make strides, there are certain initiatives which would benefit greatly from the engagement of professional associations, government or nonprofit collaborators.

**Halt the impending identity crisis.**
Design educators, practitioners and professional associations must work together to clarify the role of design through a shared definition of the various disciplines, a standardized body of knowledge for
each specific design discipline, a common articulation of how these design disciplines as well other work partners contribute to the holistic user experience, and possibly certification processes.

**Expand the diversity of the design community.**
Design is very much a multidisciplinary and multicultural field. Within any given academic institution or professional practice, the designers have backgrounds in fields ranging from engineering to the human sciences and they represent cultural heritages and educational philosophies around the world. However, diversity gaps still exist within the design community.

**Modify academic rewards structures to encourage collaboration.**
While interdisciplinary collaboration is touted as critical within the design community, it is not always rewarded in academic settings. While not every design program is housed in a standard university system, those that are face the challenges of tenure ship and institutional politics.

**Model for the Industry-Academia Collaboration**
We would like to propose a model for the Industry-academia collaboration.

Fig:-Model Schematization

The following described model comprises three phases: preparation, diagnosis and solutions development. In the preparation phase the university’s member must establish contact with the industrial company top management. The objectives of the project should be collaboratively defined after a wide-ranging brainstorming concerning the company general requirements and professor’s group expertise. It is critical for the project success to involve the company top management at this phase, in order to assure both the employees active involvement during the following phases and the matching between the project results and company expectations. The next step is the definition of the project tasks and intermediate milestones. The professor and the student at the university side, and the head of product/production sector at the company side, should be involved in this step. The objectives of the defined tasks and the methodologies to apply must be very clear, in order to simplify the communication and to avoid higher levels of expectation than the ones withdrawal at the project end. It should not be forgotten that the project content must not only aim the reduction or the elimination of the company organizational and/or technical problems. It must allow the application of universal scientific- and/or technical-based methods and tools and must promote their incorporation.
as knowledge in the company. After last step approval by both sides the project can start. The diagnosis phase begins with the information gathering from the manufacturing system, work labor, product and process characteristics, etc. The students will lead this phase by collecting data and asking for inputs from the production/product responsible and from the technicians directly or indirectly involved.

Depending on the project type, these data can be qualitative and/or quantitative. Preferentially the information collected from the technicians and operators should be done at the shop-floor and without the presence of the responsible. This task of the diagnosis phase must be compact: it should run for about two to three weeks, with at least four days-a-week presence of the students at the company to guarantee their natural permanence in the manufacturing system environment. The success of this task depends on the quality of the information gathered. After collecting the information, the students can continue the diagnosis through the identification of weaknesses, strengths, limitations, critical points, etc. and through the purposing of general solutions these two tasks should not be performed at company premises. The outputs of this phase are a short and concise report and, most important, an oral presentation of the first phase results in a working meeting.

The last phase comprises the detailed development of the solutions selected in the previous phase. Each solution must be described in detail and its technical and economical impact estimated and analyzed. So, in this phase are developed either procedures or tools, which must be validated with the available data.

The presentation of the results of the solutions development phase is done using a procedure similar to the one used in phase 1. The impact of the developed proposals must be presented under more than one scenario to allow the estimation of the potential implementation benefits for the company in a simple but clear way. The aim is to provide the company with systematized, simple and technically and/or scientifically supported information to support the robustness of the decision-making process.

**Conclusion**

Research’s engagement with industry must start at the project functional review stage to enable industry to understand what core objectives of the project are. This single decision will save considerable money and time. Those industry partners can then go away and find relevant solutions.
to solve functional problems. It will also begin valuable work-team interaction. Research needs to attract appropriate development funds to engage industry early.

This early investment will save project expense and deliver a more cost effective instrument. Both industry and research need to provide and resource appropriate project management personnel and ensure that technical staff are not distracted by this function. Industry and research must make time for cross-team interaction. Tasks include: define the project requirements, explain methods of work and the work drivers, identify skills crossover and gaps, build a sense of team and open communication. Get to know your collaborator’s work environment and day to day realities.