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Engrossing Industrial Professionals: The Role of Academia on Industrial Innovations

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At present, the global employment situation is alarming and Pakistan is one of the hardest hit on global job crisis which is likely to continue in near future. A solution to this problem deems necessary and a vital role can be played by both Academia and Industry by working together and collaborating to develop industries and create jobs. This paper is focusing on developing a project monitoring and control system which will monitor project requirements at industry, and bringing those projects to students by the Industrial Specialists. The paper proposes a ready to implement model to bridge the gap between the two that may result in reduction of job crisis.

Field of Research: Engineering Management

1. Introduction

In Pakistan, at Government level, efforts are being made to reduce the unemployment rate by diverse schemes but to make it effective, all the entities in the society will have to play their part. From the university perspective, this can be consummated through building up a university-innovation system where campus policies encourage and reward industry collaborations.

From the industry perspective, goal can be achieved by industry providing their skilled professionals to work with the young innovative minds at academia to bring the required market demand. Ultimately, the goal is to promote an environment that supports innovation, creativity and entrepreneurship and consequently increasing opportunities for students to get engaged with developing new technologies.

Despite the fact that universities and industry have different missions and cultures, there are reciprocated benefits to these collaborations, as Award said that academics and industrialists have a different mindset and they are living in different worlds (Award 2009).

A system is required to effectively create an association between these two; some universities at international and national level are lucratively implementing different models for this purpose.

This paper seeks to contribute to our understanding of this changing relationship in three ways. Firstly, a thorough research is been carried forward on the obstacles that are causing a gap between Industry and Academia. Secondly, an evaluation of some

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international and national universities is analyzed that have successfully implemented the models in which Industrial professionals are engaged by the universities to bring forward industrial innovations to the students to play their part. Lastly, this paper is focusing on developing a project monitoring and control system which will basically monitor project requirements at industry, and bringing those projects to engineering students by the Industrial Specialists.

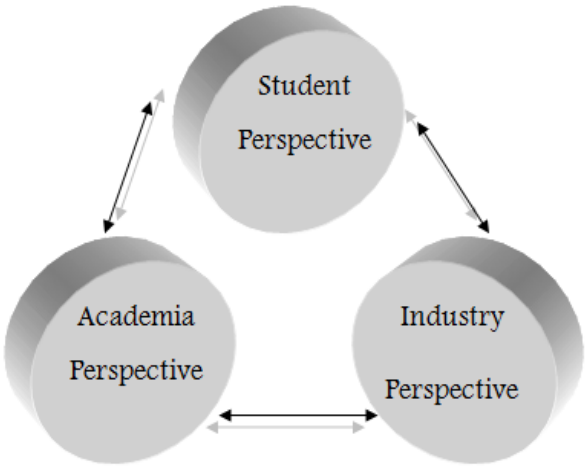
The main focus is to propose a detailed and ready to implement model for universities in Pakistan to bridge the gap between Industries and Academia that may result in fruitful reduction of job crisis and ultimately play a role in national development. Literature Review deals with the institutions that have already deployed models for bridging the gap followed by the methodology and proposed model.

The paper is organized as follows: Section 2 deals with literature review and section 3 focuses on methodology. Discussions and conclusions are provided in section 4 and 5 respectively.

2. Literature Review

At international level, universities like MIT and Stanford University have developed their research and collaboration offices like MIT ILP (Industry Liaison Program) and CIS SU (Center for Integrated System Stanford University) respectively, the purpose of these centers is to form a team of graduate students, faculty and industrial liaisons all the way through research and provide a forum for executing exchange between industrial partners, companies and university. Triple Helix concept focuses on University-Industry-Government Relations, with a core purpose of bringing the strengths of university, industry and government for the prime reason i.e. national development.

Figure 1: Interlinked Perspectives of Industry, Academia and Students.



The diagram illustrates that the perspectives of three entities are interlinked, which are as under:

Student perspective

Students during studies and at the start of their career mostly have unrealistic expectations regarding salary, mobility and position. Degree alone can't get them job although young graduates are quite determined. A positive start should be taken by the students during their studies to gain experience which may lead them to a path directing towards their destination.

Academia perspective

Academics essentially are not aware of the dilemmas and constraints of industry. Industry interaction should be made frequent .Academia has long range goals and go all-out to get recognized from peers unlike industry.

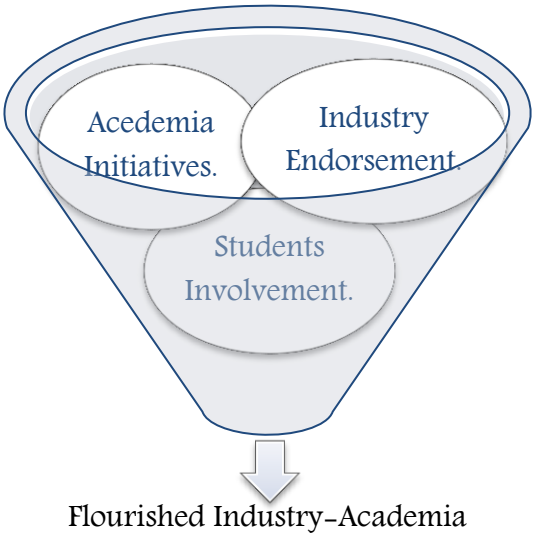
Industry perspective

Industry prefers established solutions with a minimum risk and is primarily concerned with costs. Perkmann et al proposed to implement research-driven productivity at industry level, as he believes that research driven consulting activities to be positively associated with research productivity, opportunity-driven consulting will have a negative impact (Markus Perkmann and Kathryn Walsh 2008).

The main scope of the paper is to formulate a model keeping in view the contributions yet done in this respect for both industry and academia. The efforts of University Students in Pakistan are not well utilized and on average most of the students are unemployed. Similarly industries are not that stable and up to the mark. This model, Industry-Academia Linkage Model (IALM), will help the industries to bring the projects to the universities and universities will get the project done with their basic research knowledge and innovative skills to convert it into applicable products.

Industrial Professors will be employed to play their part as Industry Professors at academia. Developing innovation cells at universities with industry representative to guide the faculty and students about the market and industry demand. Blurring these boundaries between academia and industry will open a gateway to employment, revenue generation and over all national development. University-industry partnerships may spawn new industries as well.

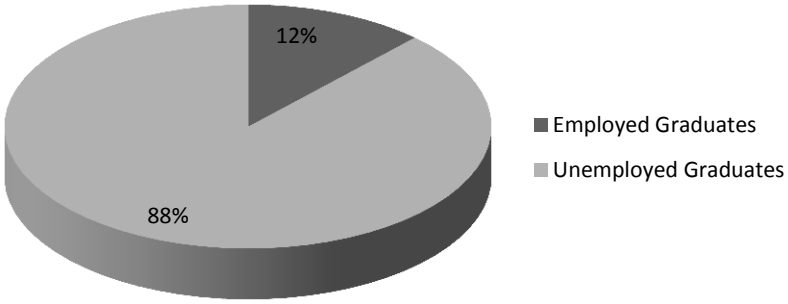
Figure 2: Integration of Three Essential Features for the Diminution of Industry-Academia Gap



3. Methodology

According to the OECD's (The Organization for Economic Co-operation and Development) Global Education Digest, Pakistan produces 6.3 per cent university graduates each year and the unemployment rate of Pakistan has reached to 5.6 per cent. The government plans to increase the employment rate to 10 per cent by 2015 and 15 per cent by 2020. To meet this goal, lessening the unemployment rate in Pakistan is compulsory since merely increasing the number of graduates will not be favorable for the economic growth of the country.

Figure 3: Pie Chart Showing Percentage Employed and Unemployed Graduates per Year.



From the last few years various universities in Pakistan are working on developing ways to bridge the gap between industry and academia. Incentives like Faculty Development Programs, Professional skills enhancement, R&D Cells creation, Refresher Training Programs, Student Support Fund, Alumni support programs and reviewed curriculum implementation have already been taken.

After profound consideration of the reasons and analyzing the former work of several researchers, a generic model is been designed which is geared up to be implemented and comprises of following steps:

Step1. Creation of a network at Academia

A network or a representative cell should be build up at Academia for the exchange of knowledge between Industries, National and Multi-National Companies, Universities and Foreign Research Institutions. Making a central point of contact at universities for companies to engage and pursue collaborations is important as it makes it easier for interested companies to investigate a university's offerings and navigate quickly. This Cell will basically work as a medium between Industries and Academia. The purpose of this cell will be to accelerate the communication between the Industry Professionals and Academia Professors. Professors at academia will tell representative cell about the innovative ideas and about the Industries they want to approach for future endeavors. Similarly, Industries will also approach this cell in the case if they want to assign task to the students.

Step 2: Signing Contractual correspondences

To build a long-standing and committed relationship, a contract must be formed defining the requirements, mutual benefits, pros and cons and above all agreement of both industry and academia to achieve a target altogether. These agreements may lessen administrative hurdles and standardized templates simplify the legal process that companies and universities use to confer projects. As Stevens said that there needs to be a common language i.e. set of terms (Stevens 2009).

Step 3: Engrossing Industrial Professionals

The well-known Industry professionals, having significant experience and clout in their respective Industry, should be engaged to work as *Industrial Professors* at Universities subsequent to their industrial working hours .Academia will employ these industrial professors as their visiting faculty and will reimburse them accordingly. Being a part of industry, these professors will anticipate and bring the industrial prerequisites and future demands to the universities and utilize the student's potential to develop an end product beneficial for both students and Industry. Industrial professionals will work dedicatedly as they will be compensated for it and will be working as employee of university. Students will work deliberately to secure their future and get trained as per the industry requirement which will result in a dynamic outcome.

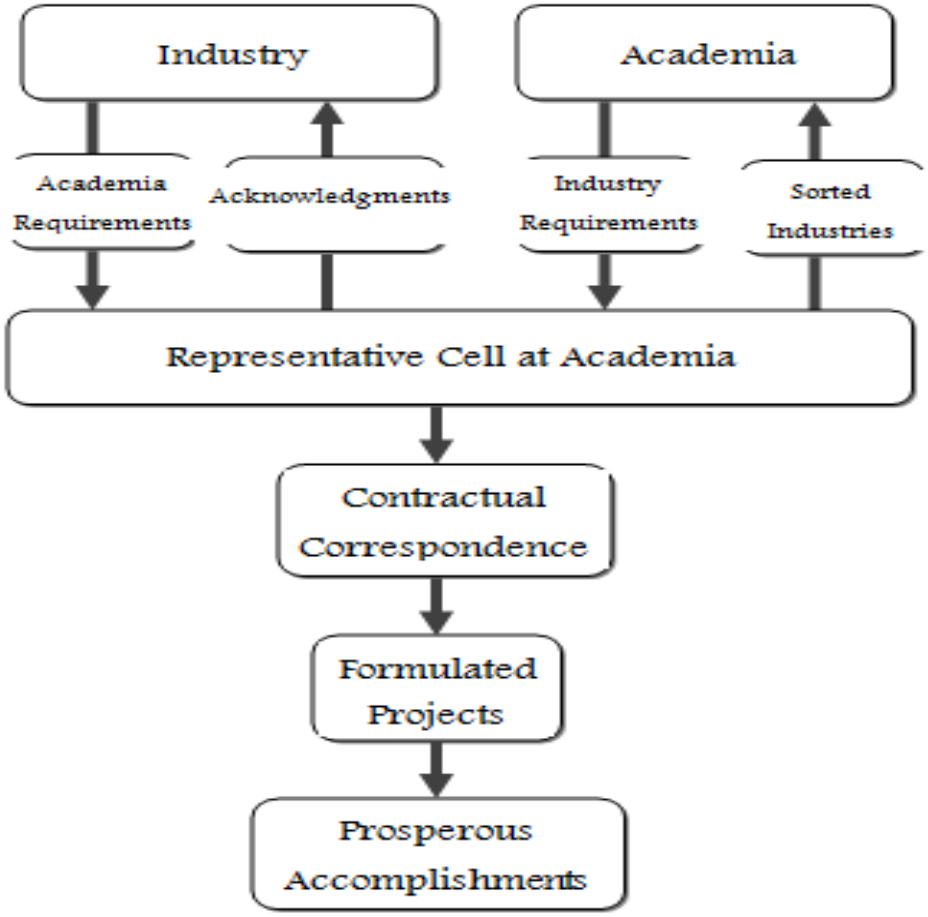
Step 4: Acquainting Developed Projects to the Industries for Execution

After the exultant development of the product, it will be liability of the industrial professional to present his work taken from the students to get acknowledged and accepted by the Industry. The chances of project failure will be lessen since projects will be done under the supervision of industrial expert and as per market demand.

Step 5: Promote the Opportunities for Raising Employment Rate for National Development

This Industry-Academia collaboration will open doors of opportunities for the students in two ways; *firstly* they will get trained before entering the Industry. *Secondly*, companies instead of looking for new employees will prefer to indulge already trained students to work for them.

Figure 4: Flow Diagram of IALM



According to the flow diagram, representative cell is a mutual point of interaction for both academia and industry. Academia will let know its industry needs to the representative cell and representative cell will not only sort the requisite industries as per requirement of academia but will in addition make them contact each other. Correspondingly, representative Cell will approach industry to tell them academia requirements and convince them to take a step forward to collaborate with academia and their acknowledgement will be forwarded to the academia to make an initiative and contractual correspondences should be carried forward. Formulated projects will result in prosperous accomplishments for both Academic institutions and Industries.

This process must be guided by a complete shift from one-time set up to incisively-driven IALM set up. IALM propose a solution that connects everyone and sets a ground for the flow of knowledge, a similar methodology is proposed by Brain et. al. to map knowledge flow as well as linkages between organizations (Brian Rappert, Andrew Webster and David Charles 1999).

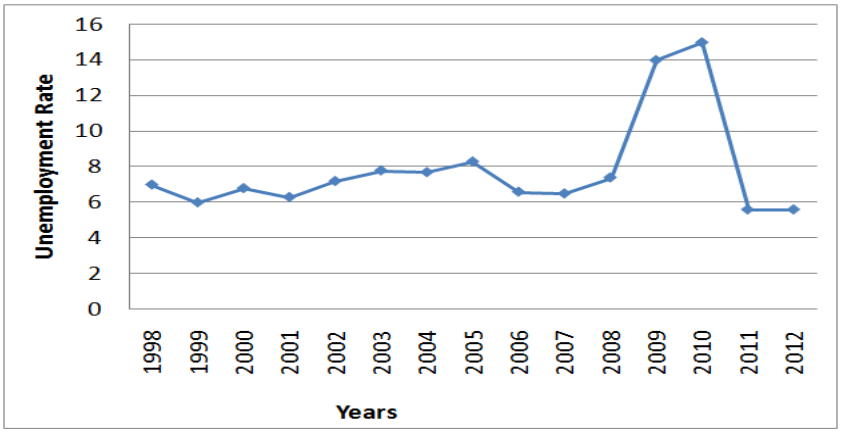
4. Discussions

Even though unemployment rate is mounting day by day worldwide nevertheless Pakistan seems to be the prevalent victim of this problem which is creating many economical as well as social issues. According to latest U.N report, the global employment situation is frightening which also warns that recovery is not

expected any time soon. Graph shows the fluctuation in the unemployment rate of Pakistan in the past 10 years which makes it necessary for all the entities of Pakistan to step forward to play their part to reduce it to minimum.

Presently, as we are focusing on the collaboration of Industry and Academia; not surprisingly, the harsh reality is that the academia is not geared to face the challenge of translating an embryonic idea into development of technology. Similarly, Industries prefer solutions to their problems and requirements with low risks and focus on short-range objectives. Different universities are corresponding with the industry to bring the projects to academia with an idea to bring some innovation to industry than just training the students to reinvent the wheel.

Figure 5: Graph Showing Yearly Unemployment Rate in Pakistan



As only education cannot surrogate real-world experience, the proposed model has a thorough methodology to approach both academia and industry in an applicable and unproblematic way. Firstly, students will get basic education from the university professionals faced with real-world problems. Secondly, they will acquire hands-on industry experience needed for their future job through industry team-based project. This model, if successfully implemented, can result in the reduction of Industry-Academia gap and hence reducing the unemployment rate in Pakistan.

5. Conclusion and Implication

Industry and academia can play major role in the progress of country if both exchange mutual concord to address their problems by utilizing best brains to help each other. Basically implementation of IALM will result in the combination of experienced people from industry and new generation with innovative ideas from academia. Major industries should utilize their experienced people by giving them specific task related to industry and these professionals should bring that to academia. Such individuals and teams who have interest and connection with both the industry and academy can be used as very strong linkage for filling the gaps between industry and academia.

The five steps discussed earlier in IALM can ensure successful progress in bridging this gap, and also creating job opportunities and providing job security to the graduates. A system with practical implementation of IALM can show significant

progress in future, lowering unemployment rate and reduced industrial problems. This exercise would help both the parties; by training the academia students and helping industries with new innovative ideas, which would ultimately help the country to progress. In future, proper methods can be devised to efficiently exchange the individuals of industry and academia.

A culture like this once developed will bring solution to many existing problems and various future enhancements can be made with this model. Channeling the resources and people from industry to academy will return more learned graduates for the industry. Virtual links can never build a strong link between the two; only real people can make this possible

Since Industry-Academia relationship has keen significance, a lot of work has already been done by the researchers and the existing research paper has taken a further step to bridge the Industry-Academia Gap by giving it a shape of IALM. There is a strong need of change from academia end to commence focusing on applicative research rather than basic research. Instead of Final year projects selected by students, 'Industry Projects' by the industrial professionals should be assigned to the students, sponsored by industry where students are to solve industrial problems and give exposure to the real-world backdrops.

A large industrial project can be assigned to different number of students by making small modules to maintain the same environment for all students. To speedily cover up the journey from conceptualization to commercialization, it is necessary to set up representative cells at academic institutions in near proximity for making the interaction more potent. Since the prospective benefits of this collaboration are huge, breaking down the barriers between these two worlds will stimulate many new technologies and ultimately speed up the economic growth.

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