University-Industry Cooperation Development in the Republic of Kazakhstan

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ABSTRACT

With a dramatically increased demand from technology and software industries for higher competence, university-industry cooperation is becoming an increasingly important subject. This cooperation has previously been shown to be for advantage of the industries as well as a suitable tactics to in early stage recruit students.

This paper has investigated the relationship and cooperation between universities and industries trough exploratory research (case studies) and comprehensive interviews with relevant contacts at different IT (Information Technology) companies and Universities in Kazakhstan. From the information collected from these interviews, we´ll examine and conclude what makes this cooperation beneficial for both parties as well as the issues that arose. Based on these interview results, recommendation for industries as well as universities to improve their cooperation will be presented.

Concerning these recommendations of investigated practices and case studies, this document identifies a range of actions to enhance the relationship between universities and industries as well as identify a number of examples of good practice which universities and industries may wish to consider in their cooperation planning.

1. Introduction

Universities lie at the heart of successful, leading companies around the world (The Role of Universities Today: Critical Partners in Economic Development and Global Competitiveness, 2006). The role of world most leading universities in scientific knowledge, discovering breakthrough ideas, fostering innovations, seeding new companies and creating jobs has became important than ever. This has lead to a dramatically increased level of research collaboration between industry and universities over the past decade. Today companies see universities as source and opportunity to in early stage recruit students for the advantage of the company. These since universities today encompass much more than just education and basic research like they traditionally did.

There are a number of broad reasons why in recent years in the role of universities in contributing to the technology competitiveness of the industries has become more important.

One is the dissemination of knowledge and ideas by way of student education, collaborations with industry, and through a variety of virtual-world mechanisms such as online training and e-learning, that universities today have broader contribution to the industries and companies, their economy and their own prosperity and quality of life. This essential contribution and strong partnership that universities provide to the leading technology companies with a competitive advantage through skilled students has been realized by the business leaders in the information technology industry. This has lead to a higher initiative to integrate the industry into the universities to gain interests. Leading companies are giving away free software and hardware to the universities in order to achieve this. The fact that universities has big impact and has a growing role they play in has been supported by empirical evidence and also the numerous research analyses such as above mentioned 'The Role of Universities Today' and impact studies that have been made.

2. Purpose of Cooperation

The purpose of this paper is to emphasize the benefits of optimized university-industry cooperation. This work is meant to open the eyes of the ITC (IT Company) executives together with the ITU (IT University) leaders and making those two parties collaborate more tightly. Furthermore, there will be elaboration and presentation of how the value of attractiveness of students rises because of this initiative, together with understandings on what tactics are used by the industries to gain this kind of interest.

When thinking about this topic, one should start with the thought of a software engineering student coming out of university with several certifications in the most wanted technology. To be able to reach that goal, we need the companies to provide the universities with software, hardware and support. A prerequisite for that would be high academic initiatives from the industry and open-minded faculty leaders.

Lack of skilled personnel is one of the problems causing underdevelopment of the domestic IT market. Current IT production has a certain specificity such like as finance, technology is basically same in all companies, and the main problem is lack of of human resources. Large companies in this regard are trying to grow their own stuff. Domestic companies have a same problem, many developers are already older than 50 years, but preferable age to work in IT field is no more than 30-40 years.

Currently, IT-training industry is an important public purpose and determines the competitiveness of young professionals in the labor market, and the nation as a whole on the world market. The young specialist, completing college, is not ready to fully operate in company`s work with modern information systems and technologies. This is because critical knowledge is not an abstract algorithm, a specific tool with which this algorithm can be implemented. The complexity of the learning process the new information technologies are largely attributable to high-speed updates and changes. Therefore, IT - centers offer various courses for training and retraining of specialists in the field of IT - the industry.
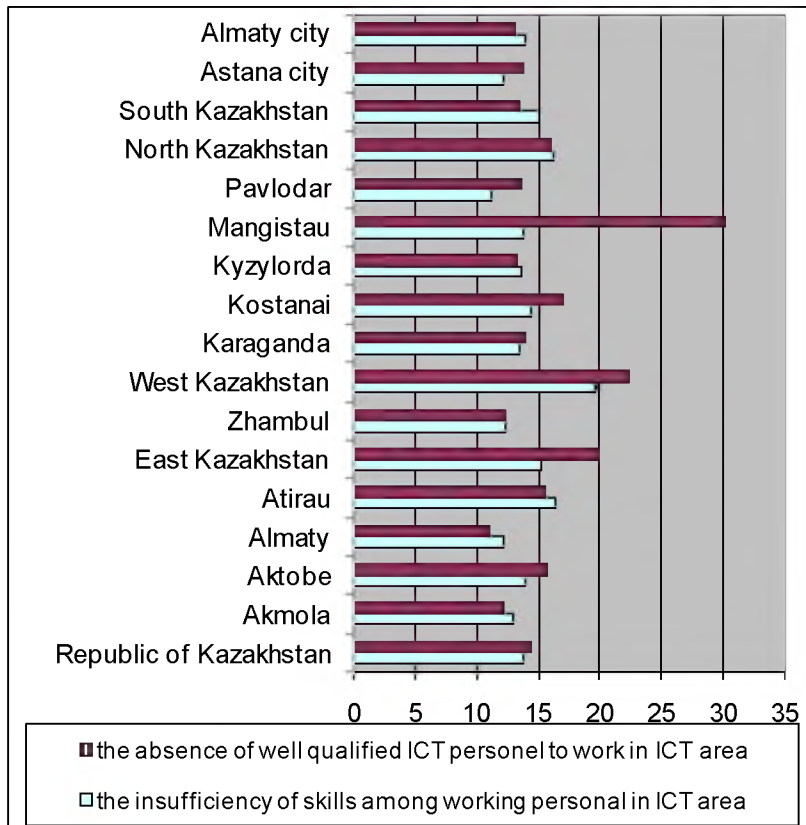

Fig.1. The absence of eminently qualified specialists in ICT field

3. Research Approach and Methodology

Based on the problem structure which in this case are unstructured researches tend to apply an exploratory research design. This means that if the research problem is hard to grasp, an exploratory research design is required. This design incorporates the collection of data from which a lead is trying to be identified. The more data, especially qualitative data, is gathered the brighter the light at the end of the tunnel gets. Furthermore the research design is very dependent on the type of research method, which in this case is the case study. A case study involves an extensive and an in depth analysis of data gathered in order to report the results acquired throughout the research. The results reflect a neutral unaffected summary of the work performed.

3.1. Research Design

An exploratory research process commenced this paper while several case studies were performed. Logically this revealed several facts and insights of the topic of investigation and increased the body of knowledge on which the further progress of this work is

dependent. To be precise several interviews with different stakeholders have been performed in order to get on sight information, which are relevant for the development of this paper. Furthermore literature of relevance for this paper has been reviewed and the outcome has been findings which fortify our hypothesis and lead to a conclusion which may be used by software engineering companies and also universities with focus on IT. The findings positively affected the drive of this project as they revealed that research and analysis of this topic performed from our perspective is highly valuable for universities with focus on IT and software engineering firms, which try to or already have established university-industry cooperation.

3.2. Method and Datacollection

The process of selecting the appropriate method for collecting data about the collaboration between universities and industry was extensive, narrowing the choice to three different methods:

1. Collective case study, one real case at the ITUK (IT Universities in Kazakhstan) and two case studies from literature:

a. The regional role of universities in technology transfer and economic development; and

b. The Role of Universities Today: Critical Partners in Economic Development and Global Competitiveness by ICF International.

The data collected will be used to create a detailed description of the case, formulate the main issues as well as it will provide the basis for the researcher's interpretation about the case.

When multiple cases are chosen, a typical format is to provide a detailed description of each case and themes within the case (called within-case analysis), followed by a thematic analysis across the cases (called a cross-case analysis), as well as assertions or an interpretation of the meaning of the case. In the final stage, the researcher reports the "lessons learned" from the case (Lincoln and Guba, 1985).

The type of data collected will vary between qualitative and quantitative. Qualitative data will regard the information about the different ways of cooperation between companies and universities as well as the advantages and disadvantages of that cooperation. On the other hand, the quantitative data will present the financial benefit of the collaboration for the universities as for the companies.

A lot of involvement from the stakeholders will be needed in order to validate the research findings from this paper. Let us say that a software engineering company contacts a university and decides to offer free education material and hardware for studying their technologies. The university will see the results immediately through increasing growth of students applying to the programs and courses containing the materials that the company offered. The company, on the other side, will first see the results when these students are out of the school benches.

4. Structural Framework

Interrelations between universities and industry are considered as an important topic for further research, which is proved by numbers of publications addressing the matter. This research will contribute to the literature by highlighting the importance of the university-industry cooperation.

One of the case studies from the literature used was Chrys S. Gunasekara's *the regional role of universities in technology transfer and economic development*. This study was focused on the role of universities in the development of regional innovation systems while most of the studies on the topic concentrated on of institutional analysis of university-industry technology transfer. Several funds in the European Union (Cohesion Fund, European Regional Development Fund and Structural Fund) have the duty of improving regional competitiveness. The funds have highlighted the importance of regional partnerships between public sector, business, higher and further education and business support organizations.

The other case study used was Inner City Fund's (ICF) community development publication *The Role of Universities Today: Critical Partners in Economic Development and Global Competitiveness*. ICF is an international company that delivers consulting services and technology solutions to government and commercial clients. In this case, universities are presented as key role players in educating and training skilled workers in high technology and innovation. Universities are considered to be the "***primary drivers of successful regional economies today and are predicted to be the drivers of the global economy well into the future***" (ICF Social Programs & Community Development Publications, 2006).

Compared to these two researches, our research has equal purpose, putting accent on the involvement of the higher education organizations in the industry. It differs, at the same time, by providing more specific and concrete evidence in the real case than the above-mentioned researches. The research findings and contributions in this paper will be significant due to the predictions by several researches that the university-industry collaboration is the key to the future of global economy. The main reason why articles were used and not books lies in the fact that there were not any books found written on this subject.

4.1. Theoretical Discussion

The topic of this paper seems very popular and also pretty new to these territories. Of course the ITUs in Kazakhstan dates way back but why is it so hard to find records of it? Searching for material in the library was pointless, no books could be found that were closely related to the matter. In the end, the literature backup was completely relying on the articles found on the web.

The interviews have been designed around three target groups, responsible for academic initiatives of major companies, university lecturers and staff of the IT- Management department of the ITUs. All three groups gave different but valuable insights on what they are dealing with on a daily basis. The responsible for academic initiatives of the companies all share a similar opinion about how companies and universities collaborate. They constantly mention that their companies are having academic initiatives in place which offer the students access to course material which can be used in university classes, software to work with and test but also vouchers for certifications on several technologies.

In conjunction with the outcome of the interviews with the companies it is important to synthesize the findings from our second target group. The interviewees gave us valuable insight into their perspective which concentrates on combining their efforts with external contacts with the necessity to make students of the software engineering program employable at the end of their university career. Furthermore, information on what type of issues and benefits industry face was gathered, as well as their goals with establishing this kind of cooperation with universities. One of the issues faced, mentioned by LogyCom could be the implementation time and complexity to start up such initiative where IT Company sees this as challenges rather than issues.

Nevertheless they did not neglect the fact that there is an important need to create revenue for the university. The reason of the low budget that the universities in Kazakhstan have is that the education is free and they are not of a high priority to the government. Additional funding creates more opportunities for students and staff to intensify their research efforts and eventually do relevant work for collaborating companies. Especially this need was also identified by our third target group which solely deals with relationships and collaborations between faculty and company. The IT- Management goal is to create revenue by generating projects which are solved by students for technology companies. To sum up our work we have gone through plenty of material concerning this particular topic.

From existing case studies which also dealt with university industry relations to the analysis of academic relations of companies and company relations of universities, especially the ITU's.

4.   Conclusion and Recommendations

There is an old rule when doing the sales you have to know the customer. You cannot sell an expensive car to a poor family with ten children. The companies do not understand the university world; how the universities generate revenue or how many assets they have available so they treat them as they would treat any other customer. For example, a certain company delivered SAP systems to several universities. This system is quite complex, it is very difficult to get it "up and running" as well as to maintain it (it contains a database with ~40000 tables and the system has ~3000 settings windows). That is why the universities are having trouble hosting these systems. The SAP company realized that but they still wanted the universities to continue teaching the system so they established the SAP Academy in Kazakhstan which is actually an SAP company hosting the SAP system for the universities. And for that they charge the universities ~50 (USD) per year, which is really cheap compared to what they charge the other customers. But, that is not the point; the point is that the universities do not have that amount of money to invest for these purposes.

It seems that the company's academic initiative representatives got these positions as a punishment for not being able to deal with real customers. It would be better if the company would let a newly graduated student be in charge of the university relations then someone that has been working for twenty or thirty years at the company and maybe never stepped into a university before.

There are two approaches to establishing connection with a university: bottom-up. The top-down approach would mean you reach the students through management and teachers. The bottom approach is when you get to the faculty management through the selected group of students, also called the student academic working for twenty or a top-down and through faculty bottom-up student ambassadors.
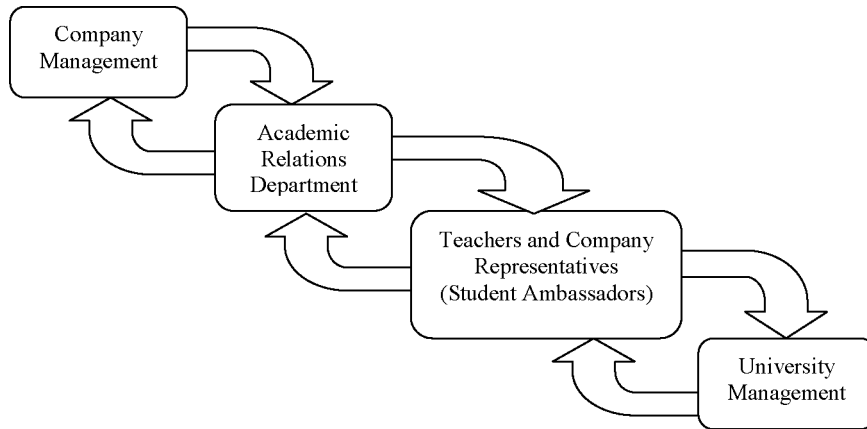

Fig.2 Proposed Academic Initiative Organizational Chart

This approach is proven to be more successful because the students are the ones that want to and are going to challenge the current technology and come up with new ideas and solutions on how to improve it. This is a way for the students to put some pressure on the faculty management to start with the academic initiative.

The ITUs management is consisted mostly of traditionalists that are afraid of exposing the universities too much and that the market could take over if they start to teach industry courses at the university. That is contradictory to the Bologna Process that all European universities accepted (including Republic of Kazakhstan) and which states that employability is of great importance for students and it should be regarded as a high priority when creating university programs and courses. The research related parts of the education should maybe be saved for the master levels of education.

The ITUs today are offering a poor variety of courses in their bachelor programs and the students end up knowing technologies that are irrelevant or unattractive. Therefore, a diversity and mix of technologies is recommended. It is not enough to know only one programming language or one type of database because not all languages or databases are that similar. For example, an employer will not hire you to be a C programmer if you only coded Java before, neither will you get a job managing Oracle databases if you only learned MySQL.
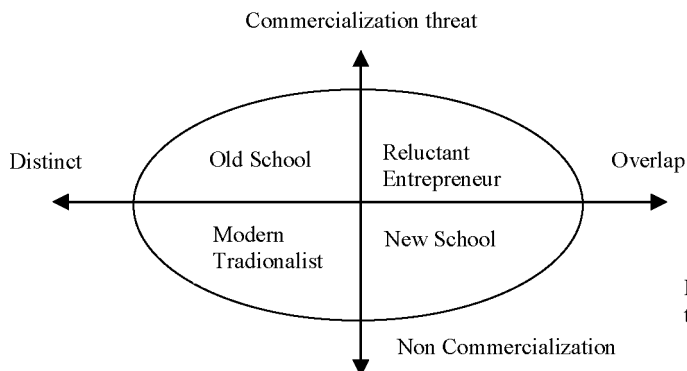

Fig.3. Ways of thinking at the academia

One solution would be that the last two semesters you could be able to specialize in certain industry standards, similar to some doctor's education programs. The reason to specialize in the late stages of the education would be that the technologies change rapidly

and the students would not be that attractive on the market if the knowledge they possess is out of date. The universities should not be vendor-specific but they end up teaching Java and MySQL which are brands of the Sun Microsystems.

The companies that have open source software are more welcome in the university world. This is something that the industry partners have to fight.

Competence is vital to the future of the students so the education should synchronize more with the market, not have the same courses for ten years. But, a line must be drawn and the industry-related courses should never replace the standard curriculum. These courses are relevant for getting the first job as soon as possible, but on the long run it is the university degree itself and the work experience that matter.

There are people in academia who take different standpoints when it comes to UIC (University-Industry Cooperation). As figure 3 illustrates, we show four different directions UIC (University-Industry Cooperation) can take in the eyes of academic people. First, those faculties may or may not be commercialized and second that it remains a distinct institution or overlaps with industry.

The modern traditionalists think that industry and university are, at best, distinct and do independent work. They see universities as special worlds which follow well understood rules to pursue academic reputations which in turn would be translated into commercial gain. An opponent to a modern traditionalist is the "old-schooler" who would never pursue commercial gains e.g. patents and puts academic achievements as his top priority. Unlike him a reluctant entrepreneur has registered one or more patent but dislikes the idea of running his own business. He rather hides behind the university curtain. In order to get the best out of UIC a person who falls into the new-school category is the perfect match for a department which deals with exactly this endeavor. He understands the importance of combining academia and industry and the need to translate academic ideas into industrial outcomes. He also believes that the new overlaps between university and industry open new pathways universities can take.

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