Research on identifying opportunities to improve collaboration between companies and professors from technical higher education

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ABSTRACT

We live in an extremely dynamic society in which classical approaches applied by companies no longer provide viable solutions to the problems they face on the market every day. Companies that will be able to quickly access information, qualified workforce and innovative solutions will be successful. This goal can only be achieved by those companies that will actively involve universities in their “life” through research partnerships, professional training programs, etc. thus being able to respond effectively to the market demands. The paper presents the results obtained through the achieved research by processing of the information collected from the teaching staff of the Technical University of Cluj-Napoca and the companies’ representatives from Satu-Mare participating in the events of the project “Specialists for Satu-Mare”. The most important findings are: the need to develop training courses and to involve professors in research activity in order to design, develop and implement new products. Finally, proposals are being made to improve the collaboration between companies and professors.

Keywords: professors, companies, research partnership, discipline content

1. RESEARCH PREMISES

“If you want a year of abundance, cultivate rice; If you want 10 years of abundance, cultivate an orchard; If you want 100 years of prosperity, cultivate people” - Chinese proverb (Sinteza gândirii, 2007).

Although partnerships between universities and private companies have existed since the beginning of the 20th century, they have become more and more intense in the post-war era as a result of increasing economic pressure and global competition, which has led to the need for interdisciplinary approaches to identify solutions to increasingly complex problems (Corzo, 2015). Faced with an increased pressure to do more with fewer resources due to market competition and an evolving technological landscape that has changed the way of people work, some companies have begun to move from a centralized R&D model to partnership with universities, because in order to successfully innovate, it is not enough to rely solely on their internal research and development. The collaboration with external partners allows them to access different knowledge bases and to reduce the costs with research and development (Perkmann & Salter, 2012). On the other hand, the universities are interested in such partnerships, as funding for research from their own incomes is limited or non-existent. When companies and universities work together they become a powerful engine for innovation and economic growth (Edmondson, 2012).
The most common forms of partnership between universities and businesses are the research and professional training (Mixon, 2014):

- The research - materializes in the form of a contract or grant to conduct a research in which both the company and the university agree to collaborate on a particular research project, each of them benefitting from certain advantages: professors have the opportunity to update their discipline taught with the trends from practice, students could get an opportunity to work for the company, and companies receive the results of research from a potential employee at low-cost.

- Professional training - is achieved when a company needs a larger number of employees with a particular specialization and a large number of available positions for trained people. The benefits of this type of program are: students will have a job after they graduate and companies will be able to hire qualified people for the jobs they are targeting.

At international level there are programs of cooperation between universities and companies providing the following aspects (Dănilă, 2013):

a. Funding programs by employers with their involvement in curriculum setting;

b. Teaching of some disciplines from the university study programs by eligible persons from employers to increase the quality of the workforce and to familiarize them with the new practices;

c. The existence of a certain offers for the students in order to find jobs in domain after graduation with a well-developed career development program.

In Romania, the research partnership between companies and universities is at early stage, the collaboration being more in the form of internships and in order to elaborate diploma papers, there being in some cases some reticence regarding the research capacity of the university and a bureaucracy that would make cooperation harder.

### 2. METHODOLOGY

In order to collect the data necessary for this research, the survey was used as a method and two types of questionnaires were created as tools, which were distributed through events II and III of the project “Specialists for Satu-Mare” (Oțel & Firescu, 2017):

- In the second event, “Collection of the proposals for the improvement of the activities carried out at the Satu-Mare Branch of the Technical University of Cluj-Napoca”, the questionnaire was distributed to a total of 67 professors teaching at the Satu-Mare Branch, and 40 completed questionnaires were received. The professors that participated in the event have classes to one or more of the three specializations, 40% belonged to the 30-35 age group (followed by the age group “over 45”, 28%) and 55% were male.

- In the third event, “Job fair”, the questionnaire was distributed to 20 companies from Satu-Mare, one for each company, of which 15 questionnaires were filled in.

The participating companies were: SC Apaserv Satu Mare SA, SC Autonet Import SRL, SC Autonova SA, SC Draxlmaier, SC Electrolux Romania SA, SC Metal Prod Service SRL, SC Metamob SRL, SC MPL Engineering SRL, SC Network Systems SRL, SC Plumbeck Consulting SRL, SC Polipol Mobila SRL, Rosendahl Industrial Services (Knill Grouppe), Schlemmer Romania SRL, Tauril Rom SRL, Technosam Satu Mare, TIE Services International, SC Unio Satu Mare, ZES Zollner Electronic SRL, SC VMV SRL, WoCo Pipe System Components Rom SRL.

These companies represent some of the most important companies in this region, that activate in the following fields: industry (80%) and public administration (20%), have more than 250 employees (46%) and between 51 and 250 employees (40%). In order not to influence respondents in any way, all the distributed questionnaires were anonymous.
3. RESULTS OF THE RESEARCH

In this research we started from the basic question: Does Satu-Mare, represented by the companies that carry out there activity here, need the involvement of the university in the “life” of the local community?

![Image](https://via.placeholder.com/150)

**a). 2nd Event / Professors’ questionnaire**

**b). 3rd Event / Companies representatives’ questionnaire**

Figure 1. – How much should the university involve in economic and / or social issues in the region?

In the light of the answers given by the representatives of the companies participating in the event, it is clear that the answer is: YES! To the question “How much should the university involve in the economic and / or social issues in the region?”, 100% of companies representatives gave the rating much and very much. To the same question, only 85% of professors believe that the university should be involved much and very much in the economic and / or social issues from the region (Figure 1).

![Image](https://via.placeholder.com/150)

**Figure 2. 2nd Event / Professors’ questionnaire – Have you had collaborations or partnership contracts with companies from Satu-Mare?**

Although most of the surveyed teachers, 67.5% had no tangency with companies from Satu-Mare (Figure 2), or maybe because of that, 85% of them are willing to visit companies from Satu-Mare in
order to identify the industrial environment’s requirements needed for the employed engineers (Figure 3).

Figure 3. 2nd Event / Professors’ questionnaire – Are you willing to visit companies from Satu-Mare in order to identify the requirements that industrial environments require to employed engineers?

Also, 92.5% of the professors are interested in collaborating with companies in order to adapt the content of the taught discipline with applicative examples to correspond to their activities (Figure 4).

Figure 4. 2nd Event / Professors’ questionnaire – Are you willing to collaborate with companies and associations to adapt the content of your taught disciplines (application examples) in order to suit their activities?

Next we wanted to get a point of view from both sides, professors and companies representatives about developing and conducting training courses, involving the industrial environment in adapting the learning process, modifying the content of analytical programs, engaging in design, development and implementation of new products (including research).
Figure 5. 2nd Event / Professors’ questionnaire – Are you willing to develop and run training courses to help develop or update the knowledge of engineers from Satu-Mare?

75% of professors are willing to create and deliver training courses to help develop or update the knowledge of engineers from Satu-Mare (Figure 5).

Figure 6. 3rd Event / Companies representatives’ questionnaire – How much are you willing to collaborate with professors from the university to develop training courses to help develop or update your company's employees knowledge?

To a similar question, 87% of the participating companies were interested in collaborating with professors to develop such courses, giving the high, very high or extremely high rating (Figure 6).

Also, 95% of the professors and 93% of the company representatives agree that the industrial environment must be involved in adapting the educational process to the requirements of the current society to a high, very high or extremely high extent (Figure 7).
Both the professors (90%) and the representatives of the companies (80%) are willing to be actively involved in modifying the content of the analytical programs in order to be adapted to the requirements of the industrial environment and to meet the current development directions from Satu-Mare giving the rating high, very high or extremely high (Figure 8).
There is a slight retention of companies representatives when it comes to involve professors from universities in the design, development and implementation of new products (including research). Only 67% from the representatives of the companies agree with this initiative to a high, very high or extremely high extent, while the professors are willing to collaborate in this direction in a proportion of 85% (Figure 9).

G1: contracts / projects;
G2: university-companies meetings;
G3: curricular development;
G4: graduate employment;
G5: hour payment for companies’ specialists.

“Professors choose topics for student projects related to the improvement of production processes”.
“By organizing joint meetings and events”.
“Meetings”.
“Through the visits of the professors to the companies in order to identify the local economic realities”.

Figure 10. How do you think it might become beneficial for companies to collaborate with the specialized professors of the Technical University of Cluj-Napoca?
In the reinforcement of the previous idea comes the answer to the question: “How do you think it might become beneficial for companies to collaborate with the specialized professors of the Technical University of Cluj-Napoca?” (Figure 10). Professors believe that the collaboration with professors might become beneficial primarily through contracts / projects (35%), while companies representatives did not offer this option among the answers. It is true, however, that 73% of respondents from companies did not answer this question (Figure 10). The question was open-ended and for the interpretation of the results the answers were grouped into five groups (G1-G5). One respondent could mention several aspects, therefore the answer could fit into several groups.

![Graph showing answers to the question](image)

Figure 11. 2nd Event / Professors’ questionnaire – What expectations do you have from the industrial environment to support and develop technical higher education?

Finally, we would like to emphasize that the expectations of the professors concerning the industrial environment for the support and development of technical higher education are: companies to help students with “practice / research topics / diploma papers” (25%), to help the university with “sponsorships” (17.5%) and “equipments / investments in laboratories” (17.5%) and to be involved in “collaborations / partnerships” (12.5%) (Figure 11). In this case too, the question was open-ended and responses were grouped into several groups (G1-G12). One respondent could mention several aspects, therefore the answer could fit into several groups.

4. CONCLUSIONS AND RECOMMENDATIONS

After the present research on the collaboration between the professors from the Satu-Mare Branch of the Technical University of Cluj-Napoca and the representatives of the companies from Satu-Mare we can emphasize the following aspects:

- The professors (85%) consider that university should be much and very much involved in economic and / or social issues in the region, while companies’ respondents (100%) have given the same rating.
• 67.5% of the professors did not have any contact with companies from Satu-Mare but these (85%) are willing to visit companies from Satu-Mare in order to see the requirements that industrial environment demands for the employed engineers.
• Even though the professors (92.5%) are interested in collaborating with companies to adapt the content of the discipline taught with application examples in order to correspond to their activities, from the question “What expectations do you have from the industrial environment to support and develop technical higher education?” we have inferred that professors would first like other types of collaboration, such as “practice / research topics / diploma papers” (25%), “sponsorships” (17.5%) and “equipment / investments in laboratories” (17.5%).
• Professors (75%) and participating companies (87%) agree to develop training courses to help develop or update the knowledge of company engineers / employees.
• In close proportions, the professors (95%) and companies representatives (93%) agree that the industrial environment must be involved in adapting the learning process to the requirements of today's society.
• Another finding concerning the collaboration between the two parties was that although both professors (90%) and companies representatives (80%) are willing to be actively involved in modifying the content of analytical programs to be adapted to the requirements of the industrial environment and to respond to the current developments in Satu-Mare, not the same thing we can say when it comes to the involvement of professors in the design, development and implementation of new products (including research). In a rather small proportion, companies representatives (67%) agree with this initiative while professors (85%) are willing to work for this type of collaboration, as confirmed by the answer to the question “How do you think it might become beneficial for companies to collaborate with the specialized professors of the Technical University of Cluj-Napoca?”. It is clear from this question that professors would primarily like to collaborate with companies through contracts / projects for designing, developing new products (35%), while companies’ representatives did not offer this option among the answers.

The reduced collaboration between universities and companies might be caused, on the one hand, by the fact that universities have failed to transfer the benefits of the research results towards the economic environment and, on the other hand, that the economic environment did not have an adequate strategy for using the high-level qualification of the academics to solve the challenges of the competitiveness they face.

Using the results obtained through this research, we can formulate some recommendations for improving the collaboration between the professors from the Satu-Mare Branch of the Technical University of Cluj-Napoca and the representatives of the companies from Satu-Mare:
• To motivate professors to develop training courses in order to help develop or update the knowledge of engineers / employees of companies.
• To determine the companies’ representatives to engage professors in research activities to design, develop and implement new products with the aim of identifying and solving economic and / or social issues in the region.
• To establish meetings between companies representatives and professors to strengthen the link between the local business community and university for the benefit of the local community.
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REFERENCES

Corzo, J. (2015). How Academic Institutions Partner with Private Industry. Retrieved April 28, 2017, from http://www.rdmag.com/article/2015/04/how-academic-institutions-partner-private-industry

Dănilă, N. (2013, May). Parteneriatul universitate – mediul de afaceri: O privire spre viitor. Paper presented at the “Absolvenții în fața Companiilor” (AFCO), conference organized by Technical University of Brașov, Brașov, Romania.

Edmondson, G. (2012). Making Industry-University Partnerships Work. Lessons from Successful Collaborations. (Science|Business Innovation Board report). Retrieved May 20, 2017, from http://sciencebusiness.net/Assets/94fe6d15-5432-4cf9-a656-633248e63541.pdf

Mixon, P. (2014). How Businesses Benefit from Service Partnerships with Universities. Retrieved May 14, 2017, from https://evollution.com/opinions/businesses-benefit-service-partnerships-universities/

Oțel, C. C., & Firescu, V. (2017). Researches concerning the stimulation and encouragement of youths to approach the technical field. Review of Management and Economic Engineering, 16 (1), 719-732.

Perkmann, M., & Salter, A. (2012). How to Create Productive Partnerships With Universities. MIT Sloan Management Review. Retrieved May 12, 2017, from http://sloanreview.mit.edu/article/how-to-create-productive-partnerships-with-universities/

Sinteza gândirii. (2007). Aforisme. Retrieved April 24, 2017, from https://sintezagandirii.wordpress.com/category/aforisme/