Managing Knowledge in Public - Private Partnerships for R&D Centres

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ABSTRACT

The organizations from private sector are living into an era of innovation, innovation that can be enhanced through research inside academic sector. The European and national initiative is to foster collaboration between them and develop a climate of challenging both sectors pursuing innovation.

The paper is proposing a model of collaboration between a private organization from automotive industry and four layers of higher education. The academic side: bachelor, master and PhD students together with a PhD Adviser, is involved into a vivid bidirectional feedback with the private organization, creating a Research Group. The methodologies used during research consist of bibliographic research, observational research inside organization and interview technique. The research proves that existing models tend to fall off when faced with frequent changes but the proposed one can enrich academic and private results.

The main purpose of the model is to develop an efficient collaboration for R&D PPPs into creation of a Software platform that integrates the continuous improvement techniques inside projects, organizations and onto human resources.

Keywords: R&D PPPs, collaborative model, automotive organization, academic sector.

INTRODUCTION

The collaboration between public and private sector are called PPPs (Public Private Partnerships); PPPs fill a space between traditionally procured government projects and full privatization (Grimsey, D, 2005). The term partnership covers a variety of concepts and practices and is used for describing a wide range of types of relationship in different circumstances and locations (Osborne, S., 2002).

Horizon 2020 is the new European Union research strategy and one of its primary objectives is the collaboration with private sector for funding the most preeminent domains of research. It is estimated that across of seven years the UE initiative will gather 10 billion EUR from the private sector, most being aimed towards Common Technologies Initiatives (CTI (HORIZON 2020, 2015). The national initiative, CDI2014- 2020 (Research, technological development and innovation) is mapped on the European program and supports as well the PPPs by budgeting 50% (Aghion, P, 2008) of programs founding for projects with private support on the defined lead axes. The list of intelligent specialization as defined by the CDI2014-2020 consists of (enumeration is exemplificative (CDI 2014-2020, 2014)): bio resources for the food sector, bio technologies for medical field, cybernetic security, the internet of future, Big Data, Extreme Light Infrastructure - the Laser project from Magurele (Eli-np.ro, 2015), ICT; *Technologies, Instruments and methods for software developments* is the domain that is further analyzed in this paper.

It was observed into the CDI 2014-2020 development that it is a low degree of scientific paper collaboration between private and public sector (Research.ro, 2015), which is further reflected into a parallel, non-productive approach on the research and development area. The main purpose of this paper is to develop a model that will offer an efficient collaboration for PPPs inside automotive R&D centers.

TRADITIONAL MANAGEMENT MODELS

Traditional management models can be classified as: “top-down”, where main directions and objectives come from the top and requirements are clearly set to each participant; “bottom-up”, developed as an improvement for the previous method, focuses on participation and motivation from team members on all stages and transparency of information (schedule, budget) (Filev, 2008).

Figure 1: Top-Down and Bottom-Up strategies, Source (Filev, 2008)

Weaknesses have been identified at both of them (overcrowding an individual / lack of control, lack of innovation / unnecessary proposals) and hybrid models emerged.

One of them is the “Transition Management”, which focuses on sustainable development by using “innovative bottom-up developments in a more strategic way”(Kemp, R, 2007); but is tailored to be a model of governance and aims for long-term change, not one that enhances innovation and creativity, needed in the academic and R&D field alike.

Figure 2: Updated top-down model for PPPs, Source “Categories of institutionalized cluster promotion” (Fromhold-Eisebith, M, 2005)

Other proposed models for PPPs target innovation, like the “Institutionalized Innovative Cluster” that adds to the top-down/ bottom-up view the explicit-implicit factor (Fromhold-Eisebith, M, 2005) for expanding initiative promoters, but notes the possible rivalry emergence between private and public sector.

MODEL OF COLLABORATION

The model (Figure 3) was conceived with the focus on “continuous collaboration”, a goal that can only be reached in a nonlinear, non-hierarchical environment. This has been observed in the Leadership/ Management field, where the top-down approach is decreasing

(Kezar, A., 2012)) and giving more space to the new collaborative view, suited for the fast-paced and complex environment that exist today.

This model is an applicative approach of multi team system (MTS) where it has been observed that effective collaboration is not something granted (Murase, T., 2014). It is necessary for the inner circles to pave the gaps and to offer the guidance inside the teams.

The academic side: bachelor, master and PhD students together with a PhD Adviser, is involved into a continuous bidirectional feedback (inner and outer circles alike) with the private organization, creating a Research Group. Modularity (from Model View to Specific Project View) is also an advantage of this structure, being possible to add new persons regarding the project needs in any layer.

Figure 3: Model of public – private partnership in R&D centers

The model limit unnecessary communication (spamming), issues will travel only until the layer where they will find its solution, without further escalating to other involved parties. The PhD Students will function as a middle interface for effective communication and reporting for inner and outer layers.

The creativity will not be limited like in a top-down management / leadership model and everyone will have the equal opportunity to enrich the project with ideas and enable a multicultural community.

The architecture of project that is developed through the previously described collaboration must be structure in a way that offers high flexibility and opportunity to divide big phases of development into small activities. The desired flexibility is the possibility to add or remove functionalities from the project with few amounts of work and with small or no changes into the other modules, modularity being the key objective.

PLATFORM ARHITECTURE

In order to prove the efficiency of the proposed model, a complex project was started in collaboration with Continental and LBUS. The project consists of a core software platform with different functionalities that can improve the performance of an organization: a knowledge management system, a quality approach for R&D and an intellectual capital measurement system.

The modularity of the model described earlier is mapped perfectly on this kind of projects and well suited for complex activities with requirements / clients demands that are in a constant change.

The architecture of Intellectual Capital Management Platform (ICM) is structured into two layers, the Core layer and the application layer. Into the core layer are implemented all the functionalities that are common for the entire platform like the connection, storage and manage of databases. Also the interfaces with the tools that are already used inside organization will be implemented into the core layer, in order to load data for processing in an automatic way.

The application layer is divided into three approaches that are focused on: project continuous improvement, human continuous improvement and organization continuous improvement (Figure 4). This structure will make possible the management of activities during development to be divided between 2 and 4 teams; one team will be responsible for the core part and the others for the application layer.

The project continuous improvement is implemented through a model that integrates the knowledge management techniques and Design for Six Sigma methods; DFSS is a structured method developing new products, align with needs of customers involved during early stages of product development (Nicolaescu, S. Ș., & Kifor, C. V., Lobont, L., 2014). The model has as main purpose the prevention of the firefighting syndrome, the increase of product quality and customer satisfaction. The software platform is offering a guideline, a tracking of the QEC model and also a way of handling of knowledge inside a DFSS project.

Figure 4: ICM Software Platform

Knowledge processes are non-stationary and in today accelerate rhythm of doing business all KM systems are in danger of becoming obsolete before the benefits will appear the paradox of a game with its rule in a continuous shifting. A corrective action can be the creation of a flexible KMTS system of sharing tacit knowledge between employees. Here everyone can be an agent of change and propose new models so the KMTS model will shift in the same phase as the corporations shift.

The development of the organizations depends greatly on harvesting the knowledge, being important to learn from previous mistakes and to capitalize this asset (Nicolaescu, S. Ș., & Kifor, C., 2014). Intellectual capital measurement is a system that is able to analyze the competencies of employee and to make correlations between the needs of the project team or department. The results will measure the knowledge inside a team and will support the management decisions.

AUTOMOTIVE ORGANISATION COLLABORATION PARADIGM

This study presents a best practice example: Continental Automotive Systems Sibiu – Lucian Blaga University of Sibiu Partnership, focusing on the both-sided, successful collaboration between these two entities. Continental Automotive Systems Sibiu could be an example of applying our R&D PPP model due to the fact that it already employs students, master graduates and PhD attendees and also has a long lasting relation with

LBUS, "Lucian Blaga University of Sibiu". This year, 2015, marked the ten year anniversary of this PPP (Centrul de Comunicații al ULBS, 2015), with the contract being prolonged from 2013, and new investment paths on continuous development were opened for fostering innovation and promoting excellence in teaching and research.

Below, a selected overview of the collaborative activities between Continental Automotive Systems Sibiu and Lucian Blaga University of Sibiu (for collaboration activities before 2012 details can be found at Burdusel, Balan and Plohod study (Burdusel, Balan & Plohod, 2014) organized into four distinct categories, are detailed:

1. *Activities* include

- Job shops: Promoting employment opportunities and recruiting suitable candidates for available jobs or internships (yearly participation, 3rd edition 2015)
- "Open doors" activities: LBUS students visit the Conti location (organized yearly during spring time)
- Student events: Organizing student events in order to offer them the opportunity to openly address Conti specialists (Technical & HR): Breakfast for Brains (4 editions since 2013), Conti Day (1 edition in 2014) etc
- Contests: Hardware, software and mechanical engineering student competitions; Conti Mechanical Design Contest (500 euro prizes)

2. *Programs* consist of

- Student Summer Internship Program: Organizing a 3 months paid internship program for students during the summer time, targeting over 60 students yearly
- Graduation Diploma Project: LBUS students are being supported by Conti specialists in the development of the structure and implementation of the practical part of the Diploma Project, targeting about 15 students each year

3. *Curriculum design and development* on

- Courses: 15 courses included in the mandatory curriculum - delivered by Continental Sibiu specialists focusing on: Microcontrollers in Automotive, Electronics. Hardware in Automotive, Embedded Systems, CATIA V5 seminar, Dedicated Systems Applications
- Graduates: an increasing performance with each edition of the courses (in 2010 the average number of graduates was 30 students, in 2014 the number is higher, at 40 students)

4. *Frame contract* based on

- Conti info point: A permanent info stand within the university where students can access updated information about Conti programs
- Conferences: Participation to an average number of 5 local, national and international conferences by scientific presentations each year
- Sponsorships: Sponsor different events each year according to the strategy of Conti and LBUS (e.g. academic competitions, conferences, events etc)

- Student Scholarships: Grant scholarships to best performing students (yearly a number of 9 students of different profiles are targeted for their outstanding results)
- Master scholarships: Supporting Conti employees in continuing education on Master study programmes at LBUS, yearly with a target of 30 employees
- PhD scholarships: 2 PhD students received study funding, one from 2014, and one from 2009
- Laboratories: Branding and equipping laboratories in Conti style. Courses are developed within these laboratories, currently 2 fully equipped laboratories and other 2 in the process of being updated; 2014 marked the finalization of an Electronic Conti Lab inside LBUS, valued over 35.000 EUR [15]
- Main hallway: Branding and renovating the main hallway of the Engineering Faculty in Conti style

The collaboration can be enhanced with experience-exchange workshops and seminars managed by both teams, Continental and LBUS, where best practices and practical examples are held regularly for developing students' competencies and prepare them for the career path.

CONCLUSION AND FURTHER APPLICABLE WORK

The classic approaches are limiting the innovation in both academic and private organizations research and development. Therefore, a new model is needed in order to ensure further improvements and collaboration, a model aligned to European and national research strategy 2014-2020.

The proposed model is assuring a continuous flow of communication between all actors involved in the process, being closer to the real, natural life models.

Further upgrades of the module will be based on the financial collaboration side: accessing academic grants, European / national research funding programs and private, organization based, credit lines for all the actors involved.

The proposed model of collaboration is currently being used on the development of the "Intellectual Resource Management Platform" and will be enhanced with fine tunings as the work proceeds, based on the defined targets and results. These findings will be documented and detailed in a forthcoming research study.

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