



Kolektor Group:
Strategic R&D relationship with
the local HEI sector drives
Kolektor into the future

*Ljubljana and Maribor,
Slovenia*





General Information

Title	Kolektor Group	
Pitch	Strategic R&D relationship with the local HEI sector drives Kolektor into the future	
Organisations	Kolektor Group, University of Ljubljana and University of Maribor	
Country	Slovenia	
Author	Dr. Samo Pavlin (University of Ljubljana)	
Nature of interaction	<input checked="" type="checkbox"/> Collaboration in R&D <input type="checkbox"/> Commercialisation of R&D results <input type="checkbox"/> Mobility of staff <input type="checkbox"/> Academic entrepreneurship <input type="checkbox"/> Governance	<input type="checkbox"/> Lifelong learning <input checked="" type="checkbox"/> Joint curriculum design and delivery <input checked="" type="checkbox"/> Mobility of students <input type="checkbox"/> Student entrepreneurship <input type="checkbox"/> Shared resources
Supporting mechanism	<input type="checkbox"/> Strategic <input checked="" type="checkbox"/> Structural <input checked="" type="checkbox"/> Operational <input type="checkbox"/> Policy	
Summary	The Kolektor Group is a large knowledge-based Slovenian company, specialising in industrial production. It cooperates with the faculties of mechanical and electrical engineering of the two largest Slovenian universities. This cooperation is mostly based on research and development (R&D) activities undertaken through common research projects aimed at supporting industrial solutions. The company also places great emphasis on the professional development of students –some of them as future employees – via scholarship schemes and through work-based learning.	



Introduction & Overview

1. BACKGROUND

The Kolektor Group is a Slovenian company with a highly specialised industrial production, Kolektor's core business lies in components, sub-systems and systems for the automotive, building and industry segments. Established in 1963, the company has evolved into a global company with headquarters in Slovenia and a widespread network of subsidiaries in Europe, the USA and Asia. The main business divisions are:

- ▶ Components and systems;
- ▶ Energy and industrial technology;
- ▶ Building technology and home products.

The company was established with the aim to produce commutators (a moving part of a rotary electrical switch in certain types of electric motors and electrical generators) for the Yugoslav market. To increase research activities, and overcome the lack of an appropriate technology at the early production stage Kolektor set up a joint venture with a company from Germany. However, their research activities were still at a low level and, when the company started to offer magnet and hybrid components, it had to engage in external cooperation to intensify its research and development and provide the knowledge that they needed.

Kolektor was lacking specific knowledge to develop new technology and products with these capabilities, which led them to initiating cooperation with the two Slovenian universities, the University of Ljubljana (UL) and University of Maribor (UM) and specifically with their mechanical and electrical engineering departments end of 70s'. With the development of high levels of trust and respect between the organisations, this 'open' innovation cooperation has developed into one that is highly important and strategic to the company. In addition to these two universities, Kolektor also commenced cooperation with the Inštitut Jožef Stefan, which is the largest research institute in Slovenia.

2. OBJECTIVES AND MOTIVATIONS

The Kolektor Group's main objective for their cooperation with UL and UM is to access their scientific expertise and R&D capabilities to ensure that Kolektor stays, on a technological level, at the forefront of its field. Having

To avoid distracting themselves from their core field of business of production, Kolektor effectively 'outsources' their R&D function to UL and UM. This gives a great deal of responsibility to UL and UM, as it is up to them to ensure their research is innovative, future oriented and leads to innovating Kolektor's product line.

3. STAKEHOLDERS

The main stakeholders involved in the cooperation are the researchers on both the business and university side, in addition to the university students. Kolektor has a **small team of R&D personnel** within the organisation who collaborate with the **university researchers** and manage the absorption of new R&D knowledge and technologies back into the company.

Students from the respective universities are also involved in the collaboration and are primarily involved in mentorship programmes, internships and business oriented bachelor or master research theses with the aim of a potential recruitment by Kolektor Group.

In some cases, e.g. when research involves new production materials, Kolektor brings in **3rd party businesses** into their research collaboration with UL and UM. The universities are then mainly responsible for researching the materials, assessing their suitability for the Kolektor production processes and ensuring the quality of the materials is up to standard.





Implementation

4. INPUTS

From the start, Kolektor made a strategic decision not to focus on excelling in R&D themselves, but working with external partners. It has embedded University-Business Collaboration (UBC) in its core strategy and its organisation's identity.

Finance

The joint-research projects that Kolektor undertakes can be categorised in long-term forefront research and daily project solutions. The first category is aligned to Kolektor's long-term strategic research goals and are co-financed by both Kolektor as well as the universities, whereas the daily project solutions are conducted more on a consultancy basis to find immediate solutions and are therefore financed only by Kolektor. In addition to its joint-research projects, Kolektor also has a large scholarship scheme for students of secondary and higher education.

Human resources – approach to new projects

When no prior relationship to a specific researcher or research group exists, Kolektor starts with a relatively small project in order to get acquainted with new research partners. Assuming the working experience is successful, the collaboration can be further developed to larger scale projects.

Research equipment

The equipment needed in the joint research activities is rented from the university or other external institutions, if the company itself does not possess particular equipment. However, efforts are being made to have own equipment in the company's laboratories.

5. ACTIVITIES

The Kolektor Group's UBC activities with UL and UM evolve around four main interrelated areas of UBC: i) research; ii) education (incl. lifelong learning and student mobility); iii) entrepreneurship and iv) commercialisation of research results.

UBC is implemented mostly within the business division of components and systems and its subfields of commutators, magnetics and hybrid products.

Research collaboration

The main activities of UBC undertaken in collaboration with the faculty of electrical engineering of UL are industrial and scientific development research projects, either funded by the company or co-funded through public funds. The initiation of UBC projects can go through multiple path ways, however the two most common are:

1. Large cooperation projects initially begin with guest lectures, or small research tasks completed by students and supervised by experts from Kolektor and professors from university. Students, under mentor supervision complete the initial review of the research area, or occasionally implement further explorations. When results are promising, the cooperation will be expanded towards a larger joint project.
2. Alternative paths for cooperation start with academics presenting their research results to Kolektor Group, and when the company is interested further common research goals are defined.

Student involvement

Many of the UBC activities aim to include students in the working process. Every year, the Group grants scholarships for schooling in secondary schools and in faculties of technical and social sciences. Within this scheme, students can complete practical training in the company and via summer work, but also undertake term papers and final theses. The scholarship provides support the following activities:

- ▶ cooperation in preparation of a bachelor and master thesis and research tasks;
- ▶ the use of the company's technology and equipment;
- ▶ mentorship in practical training;
- ▶ financing additional educational programmes during the study programme;
- ▶ co-financing of professional excursions abroad;
- ▶ practical training abroad; and
- ▶ cooperation in project work and employment after the completion of study programme.

All students who are granted a company scholarship are employed for a limited term of at least one year. Within this year, the company assesses whether the potential employee fits the needs of the company. In the situation where students show considerable potential, a job position may be offered to the students that matches their competencies.

To initiate smaller research initiatives, Kolektor sets out specific assignments that can be completed under the scope of a **bachelor or master thesis**. Besides getting an answer to a research question, this process also allows Kolektor to make a better judgement on the fitness of the student and can already steer them towards a specific professional area.

Building relationships with students and supporting their education is considered as an important aspect of the UBC activities of Kolektor. This is also evidenced through their **mentorship programme** through which employees with excellent competencies transfer knowledge and provide guidance to students.

To mark the Kolektor Group's 50th anniversary in 2013, the company launched the **international competition 'Driving the Knowledge' for master students**. Its purpose was to promote students' research work and reward innovative approaches/solutions in three competition

categories: mobility of the future, self-sufficient buildings of the future, and energy supply of the future.

Kolektor has also set-up a **student group** at the UL in 2001 that employs between eight and ten students from mechanical and electrical engineering. This group is part of the company's research unit. It serves as a recruitment tool for future engineers, especially students of the third and fourth year of their study programmes, through including them in projects. Kolektor aims to also establish additional student groups of 10-12 students in both Banja Luka (Bosnia) and UM.

Mobility and lifelong learning

Kolektor supports the mobility of researchers through study visits to universities in the form of daily excursions. The aims of the visits are to get familiar with on-going projects in the universities. Longer-term mobility of up to a few months is implemented in the form of doctoral and post-doctoral studies of Kolektor Group researchers.

In the field of **lifelong learning**, Kolektor organises 'Friday lectures' for the employees, where Kolektor invites university professors to give lectures on specific topics. Lectures are organised internally by different departments, who propose the topics of the lectures. They can be topics related to both personal development or research. This can lead to, for example academics presenting the results of their basic research, which then often leads to defining future joint research projects.

Joint research projects

As highlighted earlier, Kolektor's activities are mainly focussed towards the production and development of their products. This is supported by its research department that heavily cooperates with universities on long-term research projects. These projects for example focus on the analysis of materials, processing of composites through simulations, and the efficiency of the production process.



6. OUTPUTS

The outputs of UBC are primarily reflected in the fields of human resources and the implementation of new products.

Human resources form a large aspect of the UBC activities of Kolektor. The inclusion of students in research and working processes enables them to identify potential employees, influence students' development, establish a relationship with the university, its researchers and also adjust the curriculum to its needs.

The collaboration with UM and UL also supports the development of unique technologies and new knowledge, resulting in a larger portfolio of products. Examples of new product development include: a device for the treatment of water by cavitation between toothed annular structures, gerotor pump, open-air plasma surface treatment, or the three-phase claw pole motor.

7. IMPACTS

The main impact of UBC is the result of direct solutions for problems in the fields of product and technology development. This has led to patents, licences and products being brought to market.

Cooperation with the universities involves a large share of work in university laboratories. This has also led to the implementation of study programmes providing students with up-to-date knowledge on laboratory work through real-life situations.

The positive impacts on the pedagogical process are also evidenced through the integration of the latest scientific findings into the study programmes. In this way, students can experience cutting-edge industrial challenges. This is one of the best approaches for preparing them for their career development.

Academics also gain valuable experience in highly-technological product development. The impact of the collaboration for university academics is a diversification and broadening of their research experiences and the development of hi-tech products that are connected with the analysis of materials and processing of composites. Through their collaboration with Kolektor, academics also get access to larger shares of funding for their laboratories and research staff, allowing them to conduct more cutting-edge research.



Support & Influencing factors

8. SUPPORTING MECHANISMS

UBC is supported by the **strategic orientation** of the company. The strategy defines the link between i) the company's human resources, knowledge requirements and ii) the universities' capabilities. The board of Kolektor ensures the enforcement of the strategy, which provides a strong operational basis for UBC. In this way, the researchers of the company are supported to act openly regarding the cooperation with universities. Cooperation with universities is particularly encouraged when a university has established a professional expertise in a core domain as well as networks in related fields.

Another supporting mechanism is a set of financial incentives along with funding from national and EU sources. Examples of cooperation in national and international projects include: establishment of joint research centres (funded by the Slovenian Ministry of Economic Development and Technology); smart specialisation, e-mobility, smart buildings, smart community and mobility of staff through EU FP7, Horizon2020 and Marie Curie programmes, etc.

9. BARRIERS AND DRIVERS

The main **barrier** of UBC lies in the **different time horizons**. The universities are focused on finding solutions without time limits or the defined timeline is relatively long, but in contrast Kolektor usually requires prompt results.

An illustration of this is related to **bureaucratic processes of publicly funded projects** – for example, the long selection process that can in some cases last a year or more. In the context of the current global technological development, this delay reduces the willingness of Kolektor to be involved in the applications for public funding.

Another problem is the difficulty to predict how demanding (both **time and resource intensive**) the research will be. These problems are resolved with an open dialogue during the initiation process, which has always resulted in solutions accepted to both sides.

In addition to the research results addressing company-specific problems, UBC is very much **driven** through the **personal contacts** with professors and researchers. These contacts enable a good overview of the research activities and knowledge of what Kolektor can expect from the cooperation.

UBC is strengthened through the **personal relationships** with the **project coordinators** of the universities and Kolektor and their professional competencies and expertise. Project coordinators of publicly-funded projects are usually university staff, as they are more experienced in this respect, while company funded projects are coordinated by Kolektor staff.

10. FUTURE CHALLENGES

The main challenge for Kolektor in the area of UBC is to continue including universities in the development of the company's own professional expertise and fulfilling its strategic mission.

A further challenge is initiating cooperating with universities internationally, while at the same time to continue the cooperation with Slovenian universities.

11. CONTEXT

The company cooperates more with experienced professors and researchers but it also seeks students with general and broad knowledge; however, these students also need to be able to rapidly acquire new field-specific knowledge. The fact that the main company's facilities are located in Slovenia is vitally important for its relationships with Slovenian universities: in terms of access to young graduates as well as for development of applied research. The Slovenian Government is generally-speaking supportive of UBC, and finances several UBC related programmes, however there is still a challenge on how to link basic research with the applied needs of industry.

12. KEY SUCCESS FACTORS

Key success factors for UBC in this case are mainly related to good **personal and professional relationships** between company experts and academics. This can be defined by the complementarity – the need for technology solutions on the side of the company and the theoretical knowledge of the universities.

A key success factor in this relationship is particularly related to the company's possibility of **fast and full exploitation of academics' professional knowledge** in particular domains. In this context, it is vitally important to have **open communication** and at the same time respect the **confidentiality principles**. The areas that might represent the competitive advantage of the company and should not be revealed are well defined in advance.





Further Information

13. MONITORING AND EVALUATION

Each project has a **project officer within the company** who is responsible for the implementation of the project regarding its content. There is also a **coordination department** that is responsible for the administrative implementation of the project: reports, terms of contract, auditing etc. A project is regarded as successful if it meets its goals and aims within a predefined timeline and budget. The company regularly follows the implemented projects and their outputs.

The **human resources department monitors the graduates**; they have interviews with graduates before they finish the study programme. The success of the interaction with the students can be measured through the employability of the students.

14. TRANSFERABILITY

The model of cooperation between Kolektor and the two largest Slovenian universities can be transferred to other companies in the region. It is important that the company has a long-term strategy for the development of solutions and products that are also economically viable.

Companies should be aware of the importance of the long-term development of products and technologies. They should focus on the development of products and technologies that will be on the market in five to ten years. In this light, UBC R&D practices from Kolektor could be promoted as a role model for UBC in Slovenia.



15. AWARDS AND RECOGNITION

Kolektor received several awards that are directly or indirectly related to UBC. One of them is the Puh Award, which was provided by Ministry of Higher Education, Science and Technology in 2011. It is the highest award in science and is intended to recognise inventions, development achievements and the use of scientific results in the introduction of innovations into economic practice. The winners of this award were Kolektor Executive Director for Research Ludvik Kumar and his colleagues from the Inštitut Jožef Stefan for achieving outstanding research, development, economic and environmental effects in setting up a new dry-process production of graphite commutator.

In October 2016, Kolektor received a TOP10 Educational Management Award for its systematic investments in the growth of intellectual capital and its strategic investments in the improvement of knowledge and training of employees.

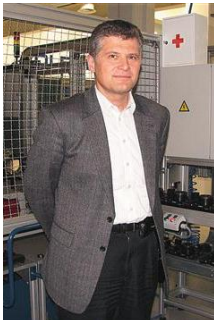
In June 2016, Life Learning Academia presented an award to the mentor of the student groups for his 10-year coordination. During this time the group implemented several practical projects.

16. LINKS

Company website:

<http://www.kolektor.com/en>

17. CONTACT PERSON



Ludvik Kumar,
Executive Director for Research
kolektor@kolektor.com