

U-SME INNOVATION: DESIGN OF A MODEL FOR JOINT UNIVERSITY - SME INNOVATION

Enterprises and university join for innovation

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Abstract *¾ The University of West Bohemia (UWB), together with academic and SME (small and medium-size enterprises) partners from the Czech Republic, UK and France, developed a model for joint university - SME innovation in a project supported by the Leonardo da Vinci program. The paper summarises the approach used in the development of the model and briefly describes its main deliverables - the questionnaire and the manual for the innovation potential assessment; training manuals assisting the implementation of the innovation system in the SME; the tool for the business planning in the technology oriented SMEs; the database UWB - your partner, providing information about the staff and the facilities of the UWB available for the co-operation with partners. Finally, the paper illustrates the application of the project results in selected SMEs.*

Index Terms *¾ Assessment, Innovation, SME training, SME-University cooperation.*

1. INTRODUOOON

At the beginning of 2001, the Czech government approved the “National policy of the R&D in the Czech Republic“, which was followed by the „National programme of applied R&D“. Both documents assume the increased participation of universities in research and development projects and in transfer of their results into the entrepreneurial sector.

These activities are closely linked to EU programmes and they form part of preparatory activities of the Czech Republic accession to the EU. The UWB is a part of the national network supporting participation of Czech researchers in the 5-th and forthcoming 6-th EU Framework Programmes. National and EU policies recognize the important role of SMEs in the economy, as they are able to react flexibly on the rapidly changing external environment. As SMEs often do not have sufficient capital, personal and

knowledge resources for their own research, the corresponding programmes offer to them various kinds of assistance and their inclusion into R&D activities.

Leonardo da Vinci programme pilot project “U-SME Innovation - Design of a model for joint university - SME innovation fits into this framework. It was coordinated by the UWB. Other participants in the CR were BIC Plzen, VUHU Most, ELIS Plzen, ATMOS Plzen, UNIT Plus Plzen, and VVV Most, in UK Brunel University, Brunel University Science Park, Techni Chem, Corac Group and in France University Montpellier, HYTEC SA, Sarl Prime Verre, Sarl Am 2e.

Innovations play decisive role in the economy of all countries, including our country. SMEs can significantly contribute to the economic development. Our companies still have a competitive advantage in lower personnel expenses in comparison with developed countries. However, this advantage is only temporary and the companies must base their future on quality, innovations and better and faster employment of new technologies.

Technology transfer and innovations require effective and efficient combination of R&D and readiness of enterprises to implement and employ new technology and know-how. It can be attained only by the cooperation of key partners – universities, business innovation centres, businesses, regional development agencies, local and central governments and policy-makers and associations with strong influence on the public. While this process is well known, respected and used in the developed countries, in our country the system of the cooperation between universities and businesses in innovation projects is still under development.

The UWB recently participated (or still participates) in several projects oriented on assistance of innovative entrepreneurship, technology transfer and R&D management. The new project built upon the experience of these projects, enriched them by new research and tried to exploit synergic effects:

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- Project INNOMAT [1], supported by the Leonardo da Vinci programme; among its outputs are training materials for the innovation management;
- Project UNISPIN CZ [2], supported by the Phare programme and targeted at the support of creation and development of new, technologically oriented spin-off companies. Project goal was to transfer experience of partner institution from the EU countries (the Netherlands – University of Twente, Ireland – Dundalk Institute of Technology, and Sweden – Linköping University) to technical universities, research institutes and organizations providing assistance to SMEs.
- Project IMHE – OECD Programme on Institutional Management in Higher Education – offered us the possibility to compare R&D management practices of the UWB with those of other OECD countries.
- Project EUPRO of the Ministry of Education, Youth and Sports of the Czech Republic – the UWB manages the regional centre of the nationwide network supporting the participation in the 5-th and 6-th EU Framework Programme.
- Project MSM 23210006 - Research and development of innovations, engineering design, technology and material engineering of industrial products – focuses on research, systematic development and application of engineering design theories, methods, and tools for quality and productivity improvement of processes in all periods of an industrial product's lifecycle.

2. GOALS AND RESULTS OF THE U-SME INNOVATION PROJECT

In the remaining text of this paper we will concentrate on the Leonardo da Vinci programme pilot project “U-SME Innovation - Design of a model for joint university - SME innovation”. The goal of this project was the transfer of experience and know-how of EU partners (United Kingdom and France) to the conditions of our country and their further development. The project fosters the university-SME cooperation in the area of innovations and innovative entrepreneurship and therefore contributes to the realization of long-term strategy of the UWB and of above-mentioned national programmes.

Project organization

All three participating universities (Brunel University, University Montpellier and University of West Bohemia) cooperated in two main areas: in research and in development of training materials. Foreign universities contributed by their know-how acquired in regional analyses of SME needs, in consulting and training activities, in creation of industry liaison offices at the universities and in life-long educational and training programmes for professional development of managers and employees of SMEs.

The UWB developed a model of extension and strengthening of university - SME cooperation, including assessment of the innovation potential of the SME and the University and training modules oriented towards solution of practical problems often connected with innovations and project management.

The Business Innovation Centre (BIC) Plzen participated in the development of training modules and their testing in Czech SMEs participating in the project.

SMEs in the Czech Republic, UK and France provided feedback that significantly contributed to the high quality of project results.

Project benefits

Project brings direct benefits to universities, business and innovations centres, R&D organizations, organizations and institutions providing trainings, consulting services and support to innovation processes and, on the other hand, to innovative SMEs using R&D results. Among indirect beneficiaries we can include regional and national authorities participating in formulation of SME support policies. Therefore, it can have broad impact in the Czech Republic.

Project deliverables allow the assessment of SME innovation potential and facilitate the development of training programmes based on the model training modules developed in the project and customized to concrete conditions of the company as assessed in the previous exercise.

We believe that project results will favourably influence the cooperation of the UWB with SMEs and one of our goals is to use the experience gained in this cooperation in other national and EU programmes.

Project deliverables and their dissemination

The project deliverables are:

- Map of the company innovation potential. Questionnaire for the company assessment and the methodology of its evaluation;
- Computer support of the questionnaire evaluation (MS Excel);
- Map of the university innovation potential in the area of U-SME cooperation;
- Seeking opportunities for innovation (model training modules and guide to the implementation of the innovation management structure within SME);
- Business Planning Development Programme;
- Database “University of West Bohemia – your partner”.

All materials are available in Czech and English, selected parts in French.

Dissemination of project results was supported by two dissemination seminars and, after the project completion, by papers, presentations at conferences and seminars and by

other, formal and informal contacts of project participants with potential users of its results.

Both assessment and training modules are used for training of SMEs managers and employees. Selected parts were incorporated into UWB curricula and we suppose their use in training of university researchers in management skills and in the life-long education.

The UWB database describes the departments of UWB. You can find there short summary of research activities and special equipment, software, etc. being offered to the solution of joint projects. The database now exists in two versions – one in MS Access 2000 and the other in web environment [3]. The searches can be performed in the MS Access version, using various search fields. This database is available to potential partners in EU programmes, especially in the 6-th Framework Programme.

The model of the cooperation assumes that the university will establish the Industry Liaison Office, which will provide a one-stop access point to the university for entrepreneurs. Such offices exist not only on both foreign universities participating in the project, but they are common at the majority of universities engaged in technologically oriented R&D. In our conditions this goal could be achieved in mid-term horizon only by pooling resources from national, regional and EU programmes.

The project deliverables are available at the virtual server of the Department of Management, Innovations and Projects [4].

The project outputs are permanently upgraded even after the project completion on the basis of newly acquired knowledge and feedbacks.

We invite all readers of this paper to use our results and we would appreciate any feedback. The results are available for educational and non-profit activities free of charge, for other use, please, contact the authors.

3. EXAMPLES OF THE USE OF PROJECT RESULTS

In a typical case, the use of project results in the SME starts with the assessment of the company innovation potential using the questionnaire. The company management answers six questions in each of the following six categories of company processes:

- Strategy and planning;
- Marketing;
- Technological process;
- Quality, environment;
- Logistics (purchasing, distribution, outsourcing);
- Organization and human resources.

With the assistance of the advisor then the company can uncover its strengths and weaknesses and propose the way how to increase the company competitiveness. The questionnaire is accompanied by several supporting tools – the manual for the evaluator, the possibility to fill in the questionnaire on-line using Internet technologies and the

tool in MS Excel, which – after the input of answers – generates the summary report. The company gets the verbal and graphic evaluation of its position and the recommendation what to do.

Figures 1 and 2 represents two possible views of graphical outputs for six companies participating in the project (A-E) and one company (F), for which the assessment was performed as a part of the diploma thesis at the Faculty of Economics of the UWB.

The assessment uses four point scale 1 to 4 (1 is the poorest, 4 the best). The results presented in the figures suggest that the companies participating in the project were slightly above average (what does not mean that there is nothing to improve there).

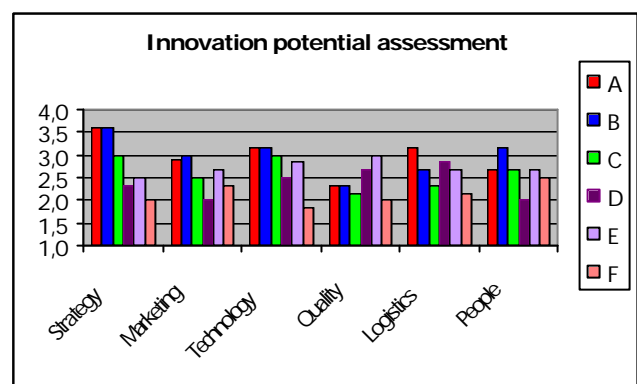


FIGURE 1
INNOVATION POTENTIAL ASSESSMENT – BAR CHART

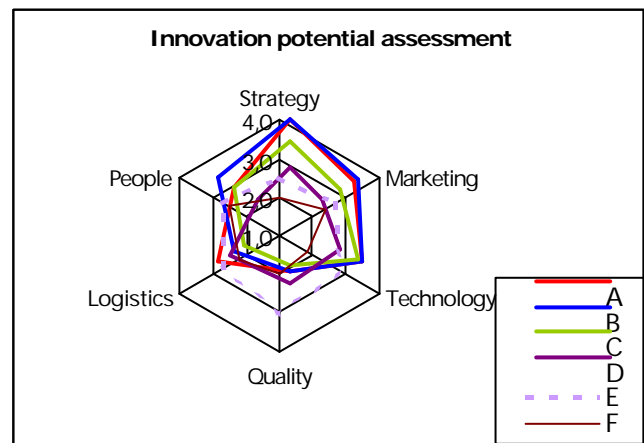


FIGURE 2
INNOVATION POTENTIAL ASSESSMENT – RADAR CHART

If the entrance assessment shows that the company is not well prepared for innovations (in most categories the results are below average), the consultant recommends measures leading to the improvement of this situation. In such a case, the basic company processes have to be improved, redesigned or streamlined and it is possible to use

standard business procedures. We have not dealt with this kind of situations in the U-SME Innovation project. If the company is in good starting position (at least average), it can perform the quick test (also available on-line) identifying its training needs. Using result of this quick test, the consultant can propose and assemble the customized training product focusing on the enhancement of necessary skills of company management and employees. In this process, it is important to take into account the specific situation of the company, including time availability of potential trainees. Our experience shows that SMEs cannot afford long trainings and it is often necessary to design very flexible modular structure.

When designing the training programme, the consultant can use the following model training modules developed in the project:

- Importance of innovations
- System of the innovation identification and implementation
- Innovation impulses
- Creativity development
- Project management
- Team work
- Company innovation culture
- Risk management and managerial decision-making
- Financing of innovation activities
- Feasibility study
- Innovation performance monitoring
- Cooperation of companies with universities and research and development institutions
- Innovation programs and education
- Practical guide to the system introduction

Naturally, these modules can be complemented by other resources, some of which are suggested in the lists of literature at the end of each chapter.

This phase of the work is completed by the proposal of the system of work with innovations within the company and its implementation.

4. FURTHER DEVELOPMENT AND APPLICATIONS

We suppose that the project results will be further developed in the following directions:

- Introduction of weighting factors into the questionnaire evaluation: after accumulation of satisfactory number of answers and their evaluation it is planned to introduce different weighting factors for different industry sectors (e.g. manufacturing, services, etc.), as we assume, that the categories of the questionnaire can have different impact on the performance of different kinds of companies. For such extension, it is necessary to collect sufficient amount of data for statistical analysis of results. The questionnaire is now used at the UWB and in the project of the University of Tomas Bata in Zlín,

Czech Republic [5] and we suppose cooperation of both universities in further research.

- Possible extension of the questionnaire – existing categories could have more questions or additional categories can be introduced into the model to better reflect the innovation performance. Some research in this direction is now performed by the Centre of Innovation and Creativity in Nové Zámky, Slovakia.
- Implementation of built-in controls: some answers are incompatible and it is possible to implement automatic checks of consistence. Now this control is performed by the consultant.
- Upgrades of existing training modules and manuals.
- Development of additional training modules oriented on specific fields of activities (design, technology management, ...).
- Transformation of training modules into the virtual learning environment EDEN recently implemented at the UWB.

As we mentioned earlier, we are prepared to cooperate with further partners on the dissemination of results and on continued research.

5. CONCLUSION

The assessment modules offer to the SME and to the University possibility to evaluate their innovation potential and, based on this knowledge, to implement measures leading to their improved performance.

Training materials from the areas of innovations, creativity, project management and other skills, often neglected in traditional university curricula, offer to SMEs managers and employees to increase the competitiveness of their companies. To the university students, teachers and researchers they can open the window to better understanding of company processes. This all would contribute to the increase of innovation performance of companies and universities and shift it towards the level of the developed EU members.

REFERENCES

- [1] INNOMAT – Innovation Management Tools, <http://iris.fst.zcu.cz/innomat>
- [2] UNISPIN CR: University Spin-off Consultancy Scheme, <http://www.tc.cas.cz/projekty/unispin/>
- [3] UWB – your partner, <http://rko.zcu.cz/leon/>
- [4] U-SME Innovation, http://www.kip.zcu.cz/USME/index_a.htm
- [5] Ohnoutková, S., “Primary role of innovation potential in strengthening the competitiveness of a Czech manufacturing company”. *Economics and Management*, vol. 5, special number, 2002, p. 37-41 (in Czech)