

[DOI: 10.20472/IAC.2016.023.102](https://doi.org/10.20472/IAC.2016.023.102)

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IMPORTANCE OF INTERNATIONALIZATION AND VALORIZATION IN TECHNICAL UNIVERSITIES SUPPORTED BY INFORMATION SYSTEMS

Abstract:

This article explores the importance of internationalization and valorization in technical Universities as one of core priorities for achieving international excellence and strengthening university - industry collaboration. The World is becoming more interconnected and Higher Education institutions can no more act on their own - they are motivated and even forced to become international. But an important topic for management of each University, especially technical, is to strengthen the collaboration with business in global environment. Valorization or creation of new products and services through innovation process is an important task for all technical Universities that want to maintain strong bond with the industry and capitalize on this process.

This article is based on research conducted between technical Universities in Baltic States, where different processes in university internationalization and valorizations have been distinguished as main driving forces of institutional development. The conducted research shows that this task can be achieved by increased international research, student mobility, large scale jointly managed projects and other international activities. After internationalization and valorization processes have been analyzed, establishing the most critical key elements for fostering both of these processes, authors present an evaluation of Riga Technical University's case as an example on how internal Information Systems provide the possibility for management to both implement strategic settings of the University and accelerate valorization within the University. This can be achieved through correct strategy development based on key elements of valorization and internationalization, effective strategy implementation, monitoring and creating of appropriate incentive mechanism where IT support play an important role.

Keywords:

Internationalization, valorization, strategy, information system

JEL Classification: O32, I23, M15

Introduction

Technical universities have three important tasks – implement study process, perform research and work on technology transfer and commercialization of new products. The third task is also known as valorization and in nowadays changing world has become important not only in the local, but also in the global scope. For this reason, authors of this article have defined which are the internationalization factors that promote valorization in universities based on the research performed in universities of the Baltic states.

Although universities might be able to apply the internationalization factors that promote valorization defined by the authors or set their own ones, an important task for management is to establish these factors as targets, and accordingly measure their implementation progress. This can be done by establishing a strategy for university and incorporating most important factors in the strategy it-self and in the action plan. Afterwards an important task for management is to control the strategy implementation process, what can be done by applying appropriate IT solutions. This article provides suggestions for managements of Universities based on literature review on strategy development, research done on most important internationalization factors that promote valorization and case study of Riga Technical University how such factors are incorporated in the strategy and measured applying IT systems.

Internationalization and Valorization

In survey done by European Universities Association internationalization between higher education conducted 61% of universities state that in last three years internationalization is one of the most important reasons for change in strategy of universities (*Sursock & Smidt, 2010*).

University must be an institution that fosters interdisciplinary, internationalization, organizational excellence, financial efficiency along with high quality study and research process and valorization. All this can be achieved through University's strategy that allows defining the path for excelling itself among other institutions and thus attracting and creating new talents within the institution.

Universities can no longer afford to work on stand-alone basis just offering industry technical solutions and cooperating on research projects and consultations. To really understand business needs, a University must work jointly and cooperatively with industry partners. In short, to be part of the business itself.

Research of role of internationalization in valorization

According to *Zeps, Iljins & Ribickis (2016)*¹ Qualitative research was carried out in form of interviews around the Baltic region (Estonia, Latvia and Lithuania). Twelve interviews were conducted with key management representatives from technical universities, where it was clearly indicated, that internationalization is seen as current driving force behind Higher Education system development. Main reasons for increased role of internationalization mentioned where following:

- European Union structural fund availability;
- Rapid increase of foreign students in region;
- Political pressure;
- International rankings;
- Development of English though study programs;
- Increased staff/student mobility and others.

In research carried out by *Zeps, Iljins & Ribickis (2016)*¹ main factors of internationalization affecting valorization – technology transfer and commercialization of new university created products – are defined. According to research – factors were categorized in three main groups:

- International Personnel;
- Industry Orientation;
- International Research.

In each group most significant factors (Table 1) are defined based on which University is able to define factors that have strategic importance to increase valorization potential. These factors are basis for key performance indicators in strategy planning process. They are crucial to synchronize internationalization with valorization in technology universities.

Table 1. Factors of internationalization affecting valorization¹

International Personnel	Industry Orientation	International Research
Full time equivalent international staff	International industry presence on campus	Co-publications with in international co-authors
International doctoral students and post-docs	Number of international spin-off companies	University journals published
Number of exchange students (inbound and outbound)	Co-publications with international industry	Collaboration in international research projects
Number of full degree international undergraduate students	Databases of research equipment available to industry	International patents

¹ Zeps A., Iljins J., Ribickis L. (2016). Increasing potential of valorization in technical universities trough internationalization. ISBN-13:978-1-941763-33-9 pp. (216-220).

Further mathematical analysis, regression and correlation analysis carried out by Zeps, Iljins & Ribickis (2016)¹ allowed to define most important internationalization factors that affects valorization categorized in three main groups:

- International Personnel:
 - Full time equivalent international staff;
 - International doctoral students and post-docs.
- Industry Orientation
 - International industry presence on campus;
 - Co-publications with international industry.
- International Research
 - Co-publications with in international co-authors;
 - International patents.

University management is recommended to apply the factors of internationalization affecting valorization (Table 1) and integrate them in the strategy. For this purpose, it is essential to perform correct strategic planning, establish control mechanism and apply appropriate IT solutions to monitor strategy implementation process.

Importance of strategic planning and control

Strategy defines a path for organizational development. The major goals are included in the core strategy document, but wider range of indicators can be defined in the activity plan.² Many authors have looked into the question on how to create a strategy development process more efficient and achieve better results in strategy implementation phase. Careful and planned approach to execution is important for successful strategy implementation, and that is the factor on which organizations fail the most.³ As well there are many approaches that recommend using such practices as involving employees in strategy development and creating financial incentives for units and employees to achieve better results during strategy implementation phase. Research done by Rapert, Velliquette, and Garretson⁴ shows that reaching internal consensus allows organizations to achieve better financial results and increases efficiency. Additionally many authors define that management is responsible for

² Kaplan R.S., Norton D.P., Using the Balanced Scorecard as a Strategic Management System, Harvard Business Review, Managing for the long term, 2007

³ Blahová M, Knápková A., Effective Strategic Action: From Formulation to Implementation, 2010 International Conference on Economics, Business and Management IPEDR vol.2, 2011

⁴ Rapert, M.I., Velliquette, A., Garretson, J.A., The Strategic Implementation Process Evoking Strategic Consensus through Communication, Journal of Business Research, 2002, 301-310

developing and sharing the vision, encouraging innovativeness, supporting employee efforts and involving employees in decision-making process.⁵

To define general strategic goals university must have a clear understanding of what it needs to deliver upon and perform gap analysis to understand where it currently is (Whitwam 2009).⁶ Along with general strategic goals, management is recommended to define the horizontal priorities – areas of tasks, which will allow University reaching the aims of core priorities. Horizontal priorities can be grouped in such sections as – organizational activities; international activities; financial activities, infrastructure development activities and other – thus defining what University must do to reach the aims of core directions. Such groups of horizontal priorities should as well be no more than 3-6 and they should be incorporated in the core processes as shown in Fig.1.

Fig. 1. Incorporation of horizontal priorities in the strategy

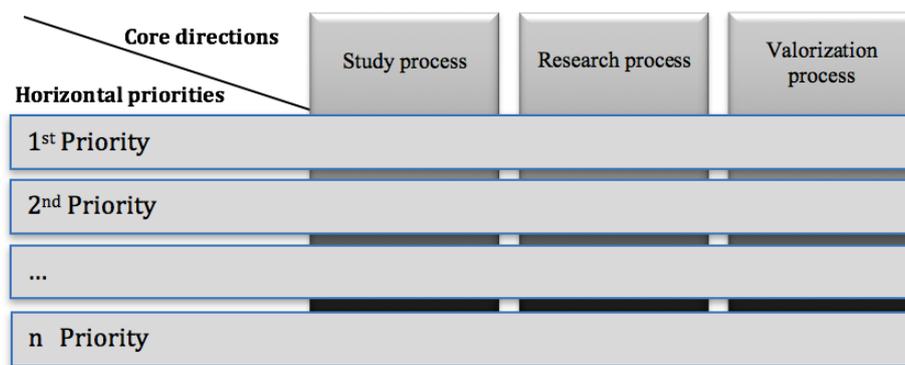
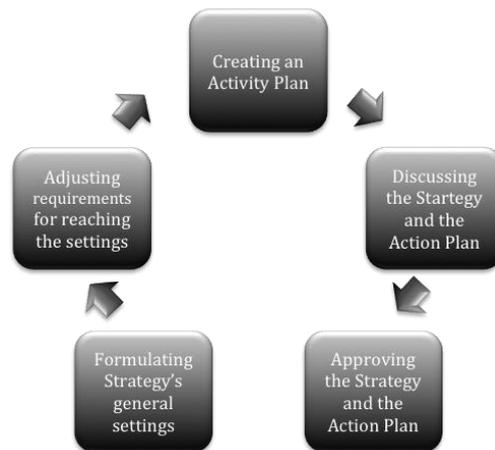


Figure 1 as well indicates how University can set valorization as one of its core directions or goals and set horizontal priorities. By setting internationalization as one of such priorities, University is able to define factors of internationalization that promotes valorization as specific targets and find appropriate indicators.

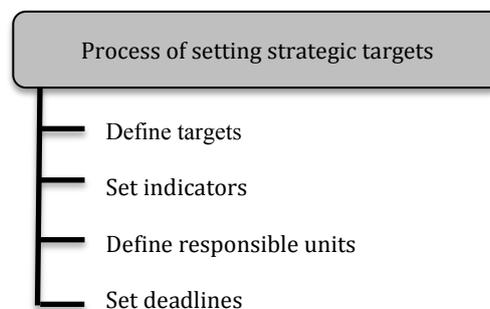
A university by formulating core directions and defining general settings sets a direction to all further thoughts included in the strategy document. It is followed by adjustment of requirements for reaching the settings. Here academic and scientific personnel play an important role. They must set up the aims according to today's trends and tendencies. When the requirements for reaching the desired strategic goals are set, university must work on action plan. That is the process of strategy development for universities (Fig. 2).

⁵ Niehoff B.P., Enz C.A., Grover R.A., The Impact of Top-Management Actions on Employee Attitudes and Perceptions, *Group Organization Management Journal*, September, 1990, 337-352

⁶ Whitwam, D. R. 2009. Implementing Effective Organizational Strategy. [online] [accessed 22 January 2014]. Available from Internet: <http://www.charlesmore.com/cms/files/Implementing_Effective_Organizational_Strategy_ID39861.pdf>.

Fig. 2. Development of the Strategy and Action Plan

For University's strategy to be implemented effectively it is recommended to create a detailed Action Plan that guides University towards its strategic aims and shows what the exact steps to achieve the defined targets are. Action plan contains detailed strategic targets based on which University is able to plan clear tasks, set measurable indicators, responsible units and deadlines. Fig.3 depicts process of setting strategic targets for units of University and elements that must be defined.

Fig. 3. Process of setting strategic targets

When the strategy has been set and university has started the implementation process it has to establish a control mechanism to monitor the strategy execution process – what can be accomplished through the usage of appropriate IT solutions. It is recommended to apply different IT solutions to increase the successful implementation of the strategy, set targets and increase valorization potential. Introduction of IT solutions must go along with appropriate processes in University and shared value concepts from divisions and employees. Described processes of internationalization and valorization in a University can be supported by different IT systems, but the most important task for management is to set them according the strategic settings and apply in the control process.

A case example: Application of IT systems to set and control strategy implementation in Riga Technical University

Riga Technical University has developed a set of information systems tools to help develop, monitor and control strategy implementation in key areas of internationalization and valorization. IT system application in RTU contains over 30 information integrated systems in total (including systems for administrative purposes, e.g. Electronic document Management System, HR Management System, Finance Management System, etc. Systems are designed to provide support to RTU strategy fulfilment. Data warehouse and reporting services are utilized to prepare strategy metrics, KPI's, reports and plans. Information Systems data are utilized in decision making and business operations. There are specific IT systems to monitor valorization indicators (Fig.4.)

Fig. 4. Valorization indicators



One of specific smart analytic tools is developed to manage partnerships – international cooperation system. This tool helps to create institutional profile with various information Tabs. In case of Riga Technical University there was a need to develop information system to:

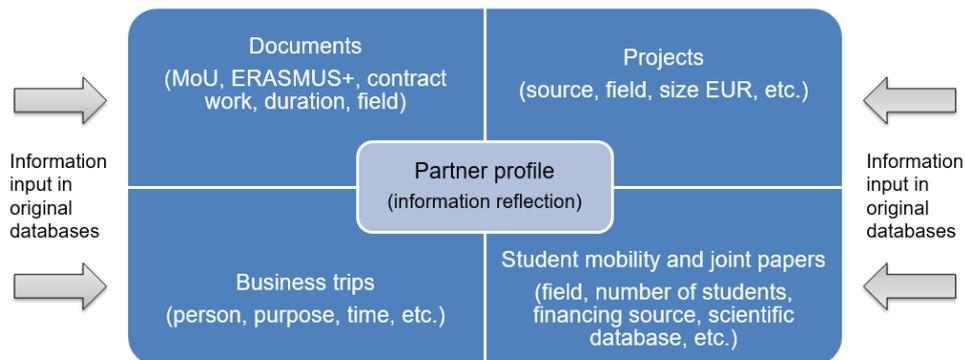
- Provide information and analysis of real time collaboration with partners;
- Summarize quantitative indicators outlined from strategy;
- Sets contact person for each partner and contact person's for more specific projects;
- With analysis and fact reporting strategic partnerships are identified;
- Regular assessment on collaborations and further actions.

Database interface is developed from two data groups (Fig.5.). Information that has to be inputted from system administrator and information, that automatically synchronizes from other databases. Later data from both groups are reflected to all users with, in this case to all employees of the university. Database allows various filter options to sort collaboration partners and analyze further collaboration possibilities. Advanced filter option helps to define one or more search criteria:

- Filter by country and city;

- Filter by partner and collaboration type;
- Filter by projects and project size;
- Filter by business trip purpose and people;
- Filter by mobile students or joint scientific research papers.

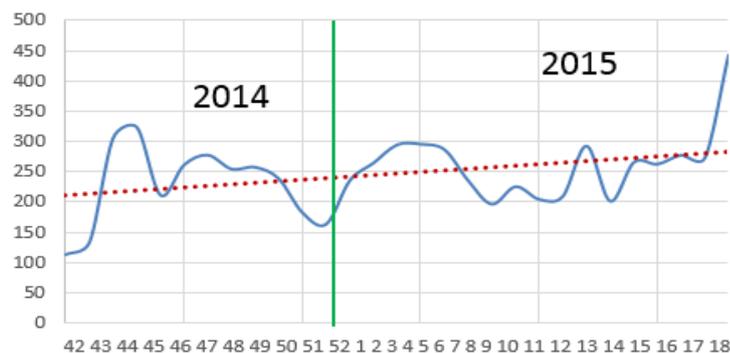
Fig. 5. Smart analytical tool database for accelerating internationalization



Information is updated in real-time and user can always access the newest information within partner profile. This system is used as working tool by people who deal with international cooperation, for monitoring purposes of strategy defined indicators and analysis to make fact based decisions.

Another important tool to accelerate valorization in RTU is Scientific Equipment and Services register - called *Use science*, where in real time potential customers can access available laboratory equipment and infrastructure and research know-how as a university provided service. This helps to develop knowledge transfer from universities to industry. Database combines services and equipment from different national and international research institutions. Fig. 6. shows, that with increase of content in database users tend to use it more, therefore making it more relevant.

Fig. 6. Use science database usage by weeks



Currently database service provides 213 services, 744 laboratory equipment from 30 different institutions. It is easy to monitor and control quantity of research services provided to industry and to set further targets.

Other IT tools such as – patent and contracts registers, project management system and full-cost system – are important to assist management in promoting valorization and assessing the reached results benchmarking them against the strategy.

Conclusions

1. Main internationalization factors influencing valorization have been defined as full time equivalent international staff, international doctoral students and post-docs, number of exchange students (inbound and outbound), number of full degree international undergraduate students, international industry presence on campus, number of international spin-off companies, co-publications with international industry, databases of research equipment available to industry, co-publications with international co-authors, university journals published, collaboration in international research projects, international patents.
2. It is important to incorporate factors of internationalization affecting valorisation in the strategy development process and appropriately monitor them.
3. For University's strategy to be implemented effectively it is recommended to create a detailed Action Plan that guides University towards its strategic aims and shows what the exact steps to achieve the defined targets are.
4. Appropriate IT solutions are crucial in monitoring the strategy implementation process – they have to be integrated, designed to provide support to strategy fulfilment and provide easy reporting of strategy metrics, KPI's, reports and plans

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