
Development of Co-operation between Lithuanian Technical Universities and Industry in the Period of Economic Restructuring and Privatisation*

Ramutis Bansevicius

Rymantas T. Tolocka

Kaunas University of Technology, K. Donelaicio st. 73, 3006 Kaunas, Lithuania

Industry in Lithuania is undergoing a process of restructure and privatisation. Universities should play a central role in reshaping the old inefficient economic system in Lithuania and forming a new, market-oriented, competitive and innovation-based economy. This calls for close university-industry co-operation. The experience of foreign institutions has revealed that the problem of university-industry collaboration, even in highly developed countries, is serious. In Lithuania this problem is of the greatest importance because the relations between universities and industry, which were co-ordinated by the government in the former USSR, are now almost completely destroyed and a new basis needs to be created. The activities of Kaunas University of Technology in this area are reviewed in the paper. The experience of EC countries in university-industry collaboration was analysed and a collaboration programme developed foreseeing three levels of activity: government, university and enterprise.

INTRODUCTION

The process of restructure and privatisation of industrial enterprises in Lithuania has almost destroyed the old relations between technical universities and industry, which, in the former USSR, were based on relations dictated by the Ministries and Government. Until recently, industrial production was declining and co-operation with universities was therefore far from being a priority for enterprises. As a consequence, universities experienced great difficulties in a number of areas, such as student industrial placement, on-the-job training within an enterprise and co-operation in research, all of which have seriously impacted on the formation of professional engineers.

Industry is now recovering, but a new basis for industry-university relations needs to be created. In the current, fiercely competitive economy, industry could benefit from the technical capabilities of academics, and, conversely, in this period of rapid technical discovery, academia could benefit financially and

in terms of knowledge and experience through industrial contact [1-5].

In this period of economic restructuring, the issues of greatest importance to the technical universities are curriculum development through close co-operation with industry, exchange of university/industry staff, consultancy to enterprises through university-based small business centres or spin-off companies, and industry financed research.

A study has been undertaken to discover the methods and forms of co-operation between universities and enterprises in European Community countries and to develop recommendations on that basis for establishing service structures specifically designed to encourage university co-operation with industry both in Lithuania and abroad, to promote co-operative ventures with industry in both training and research and to act as placement agencies for students in local industry.

THE RESTRUCTURE OF INDUSTRY IN LITHUANIA

The restructure of industry in Lithuania involves the development of private property and necessary legis-

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lation, the transition to a market economy, the development and modernisation of industrial structures, and mastery of new production techniques. By 1998 the private sector controlled 85% of enterprises and 32.5% of capital, and produced over 75% of GDP. Industry structure has changed dramatically. Changes in terms of percentage of GDP are presented below:

Table 1: 1995 [6].

| | |
|-----------------------------------|------|
| Food processing and beverages | 24.2 |
| Flour, grouts, mixed feed | 5.2 |
| Machine building | 23.2 |
| Light industry | 22.1 |
| Wood, paper | 5.7 |
| Construction materials | 5.3 |
| Fuel | 4.2 |
| Chemical and petroleum processing | 4.2 |
| Electrical power engineering | 3.0 |

Table 2: 1997 [7].

| | |
|--|------|
| Food processing and beverages | 30 |
| Chemical and petroleum processing | 27.6 |
| Textiles, clothing, knitted, and leather goods | 12.9 |
| Machine building, metal processing and electronics | 7.1 |
| Construction materials | 3.5 |

RESTRUCTURING PROBLEMS FOR THE TECHNICAL UNIVERSITIES IN LITHUANIA

Lithuania has one of the most highly educated workforces in Central and Eastern Europe, with 3.5 graduates per year per 1000 population. The country has 16 tertiary institutions, the oldest of which is Vilnius University, established in 1579, and seven of them have a technical focus. The restructuring of technical universities of Lithuania involves a transition from the Soviet system of education and government regulation of relations with industry, to a market-based system of education and industrial relations. The main problems facing universities are: insufficient research into the needs of science and graduates, low financing and the absence of priorities in science development in the country.

Industry/university co-operation in the transitional period is of the greatest importance and, due to the collapse of previous relations, must be developed on a new basis. The universities should play a central role in reshaping the inefficient old economic system in Lithuania and forming a new market-oriented, competitive and innovation-based economy. In solving the problems and confronting the issues that face techni-

cal universities, the experience of Western countries is of the greatest interest and relevance.

THE RESTRUCTURING PROCESS AT THE KAUNAS UNIVERSITY OF TECHNOLOGY (KTU)

Established in 1922, KTU is one of the largest and most prominent tertiary schools in the country. The University includes ten faculties (Administration, Electrical Engineering and Control, Informatics, Design and Technology, Telecommunications and Electronics, Chemical Technology, Fundamental Science, Mechanical Engineering, Management, Civil Engineering and Architecture), an International Studies Centre, four institutes, sixty-five departments, ten centres of science and technology, thirty-six educational and fourteen research laboratories. The faculty comprises 2874 persons (as of January 8, 1997), and includes 103 full professors and 528 associate professors. KTU has 10,378 students, of which 8482 are full time and 300 are doctoral students.

The University is successfully restructuring the process of studies, establishing necessary divisions and services for training graduates and expanding collaboration with industry under the conditions of the market economy.

An example of change in the educational process is the establishment and development of the Faculty of Administration. In the former USSR, there was no training of professionals in business and public administration, and now society needs them. To meet this challenge the Faculty of Administration was established in 1990, and it is now staffed by nine professors, thirty-six associate professors and twenty-four lecturers. It currently has nearly 900 full time students in the baccalaureate programmes, 230 Master's and 33 doctoral students. The departments comprise:

- Business Administration
- Management of Social Systems
- Public Administration
- Psychology

Degree programmes comprise:

- Bachelors of Business Administration, Management of Social Systems, Public Administration and Psychology
- Master's of Business Administration, Public Administration, Educational Science and Sociology
- Doctor of Public Administration, Educational Science and Sociology

The Faculty is widely co-operating with: the Norwegian school of Management-Sandvika (Norway);

Technical University of Denmark, Lyngby (Denmark); Aalborg University, Lund (Sweden); Lund University, Lund (Sweden); California State University, Fullerton, California (USA); San Diego State University, San Diego, California (USA); Hamline University, Saint Paul, Minnesota (USA); Virginia Polytechnic Institute and State University, Blacksburg, Virginia (USA); California State University, Bakersfield, California (USA); University of Cambridge, Cambridge (UK).

The Centre for Professional Development (CPD) was established in response to the need for the re-training of specialists in engineering to adjust to the conditions of the market economy. Its goal is to ensure that continuing education, retraining and training for new professions are provided, and to perform consultation and expert services for industry, business and the community. Continuing education and professional training in the University are mainly carried out through co-ordination of the CPD where the activities of the University divisions are insufficient to do so. So far, about 1000 people have been trained and 500 subjects consulted per year; the Centre undertakes constant investigation of the demand for training and retraining, and participates in the development of programmes for professional skills development. The CPD is self-financing (only 5-7% is financed by the University).

CPD services include:

- the development of specialist professional skills;
- retraining classes for those in the spheres of industry and service. Consultation and expert service (innovations, technology, certification of products, quality systems); and
- an on-line information service retrieval for science, technology and commerce in the STN INTERNATIONAL, COMPUSERVE, INTERNET networks.

Training programmes include:

- Quality control:
 - Total Quality Management
 - Quality systems in the fields of industry and service in accordance with the international ISO 9000 series standards
 - Internal audit
- Work safety:
 - For employers and selected staff members
 - For specialists on work safety services
 - Development of specialists' professional skills
- Metrology:
 - Metrology assurance
 - Verification and calibration of geometrical,

thermal, mechanical, electrical, radio engineering, volume, medical purpose and measuring instruments

- Personal computer training:
 - For beginners
 - For users
 - Computer graphics
- Certification and testing of products

The Innovation Centre (IC) has been established at the University. The activities of the IC are aimed at stimulating the process of innovation in the Lithuanian economy through the following:

- Facilitating the transfer of innovation to industry by means of company visits and the promotion of indigenous and foreign R&D results.
- Speeding up the introduction of novel technologies and completed scientific projects.
- Supporting small and medium-size knowledge-based enterprises, as well as emerging entrepreneurs.

The IC focuses on linking the scientific potential of KTU with entrepreneurs and the credit resources of commercial banks.

The activities of the IC are directed towards:

- The dissemination of indigenous R&D results by providing scientists with the possibility to demonstrate their achievements in international forums and exhibitions. This also involves the search for partners for joint research projects.
- The provision of consulting services on business development and R&D dissemination.

The University supports small and medium-size business development in Lithuania. This is the most popular sort of business in Europe and covers some 99% of enterprises and 80% of employees. 88.8% of enterprises in Lithuania are small and medium-size (less than 50 employees)

Support for this sort of business in KTU is carried out through the activities of the IC, CDP, Business Training Centre and Asset Evaluation Centre. The small business incubator was established by the IC in partnership with *Gesellschaft für Forschung und Entwicklungsprojektierung* and *Technologiezentrum Aachen* (Germany). Incubator includes 25 hi-tech companies on 1600m² of floorspace and meets domestic needs by designing regional business *nurturing*, consulting and financial support infrastructure. This project is part of a bigger Kaunas County supported project called *The Regional Small-Medium Enterprises Support Programme*, which is aimed at

establishing integrated systems of services to small companies that in turn will assist local, regional and national knowledge-based business development with the support of private and public authorities and organisations. The Incubator is expected to ensure that small, innovative, wealth-creating businesses and projects receive proper support and guidance to enhance the regions economic development.

UNIVERSITY-INDUSTRY CO-OPERATION IN THE EC

An analysis of activities in the area of co-operation between universities and industry in the EC has been undertaken. The aim of the study was to analyse this experience and to develop recommendations for the establishment of service structures specifically designed to encourage university co-operation with industry in Lithuania and abroad; to promote co-operative ventures with industry in both training and research; and to act as placement agencies for students in local industry. The analysis was carried out on the basis of information collected by the Technical University of Denmark in Copenhagen and in the UK during visits performed to:

- London City University
- The Council for Industry and Higher Education
- The Royal Academy of Engineering
- The Teaching Company Directorate
- Institute of Mechanical Engineers (ImechE)
- The Department of Trade and Industry (DTI)
- The Association of Consulting Engineers
- The British, Holborn and Aldwych Libraries

LONDON CITY UNIVERSITY

London has an outstanding reputation in engineering. London City University places a great emphasis on links with the City, industry and professions; it draws on a long tradition of professional education, and continues to respond to the needs of industry as well as to the implications of new technology. Much research is supported by industry. The main focus while visiting the City University was placed on:

- The Engineering Design Centre
The Engineering Design Centre has a very successful record of co-operation with industry. One form of co-operation is the *Industrial Club*, the aim of which is to enhance the research base of the Centre and to enable fast and targeted knowledge transfer to industry. The emphasis is on col-

laboration rather than consultation. Club members use the Centre as a resource that they may call upon for partnership and advice whenever the work fits broadly into its Design and Quality research mission. The following opportunities for involvement in the research programme of the Centre are offered and almost all of them are of great interest to Lithuanian higher technical education institutions:

- *Full collaboration*: hands-on research on particular products with allocation of Centre staff time. This is appropriate where the project is an integral part of the Centre's research programme.
- *Short-term collaboration*: where projects fall into the general area of the research programme, shorter periods of collaboration are encouraged. *End-of-telephone* advice can prove useful, but a few days of work by selected staff with follow-up is preferable.
- *Industrial visitors*: City University greatly values its Visiting Professors and Fellows. Visitors bring new projects and contacts to the Centre and can participate in the intellectual life and make use of all the facilities.
- *Knowledge transfer*: the output of the Centre takes three main forms: research papers, technologies and designs. Industrial confidentiality permitting, all club members will have early access to such material. For example, where software has been developed, members will be invited to participate in initial trials.
- *Workshops*: regular workshops of an in-depth and informal nature are an important forum for discussion of research findings and for internal training.
- *Summer school*: this is an annual showcase for work of the Centre, industrial collaborators and other Engineering Design Centres, and takes place in July, with all Club members invited. It is useful for general awareness of new research work in design.
- Sandwich courses
Sandwich courses (thin and thick), integrate academic education with practical training. As a result of professional experience in industry, students gain a feel for the relevance of their subsequent studies. The City University has long-standing links with a large number of civil engineering firms that employ students during the industrial

period of sandwich courses. The full time courses currently run with the sandwich courses. All courses include management topics. Emphasis is also placed on developing communication skills, an experience worth copying in Lithuanian universities.

Industrial or professional training is carried out in one or more of many establishments in both the public and private sectors of industry that collaborate closely with the University. Students fall into two categories, those who are *industry-sponsored*, and those who are *university-based*.

An *industry-sponsored* student is engaged by a public or industrial organisation as a student trainee for the duration of the course. The employer assumes responsibility, in consultation with the University, for providing industrial training. The employer pays an appropriate salary to the student during the industrial periods, and in some instances continues this payment throughout the academic period. Where this is not so, students apply to their Local Education Authority for a major award for the periods spent in the University. While there is not usually a binding agreement between a sponsoring firm and a student, it is customary for a successful student to be offered a post within the organisation at the end of their course.

- Employment after graduation

This is a problem of great importance in Lithuania. Information was collected on the activity of University Careers and Appointment Services, which seek to help students make informed and realistic decisions about their future working lives by providing them with information and advice about job occupations. At any time during their University life, students can discuss their career plans; in their final year all students are invited to attend group talks and discussions that focus on how to make vocational choices and improve job applications and interview techniques. If they are thought to be of help, the staff will make use of psychometric measures, such as interest guides and aptitude tests.

Career information covering most types of work and over a hundred different employers is held in Careers Library. Copies of prospectuses for most postgraduate courses and of the regulations of professional institutions are available for reference. There is also a wide range of video cassettes available, describing a variety of employing organisations and occupations.

Students are thus encouraged to explore thoroughly the wide range of opportunities for which their education, training and personal qualities fit

them. Final year students can obtain regular lists of vacant jobs that cover the whole of the UK and sometimes include overseas vacancies. Employers visit the University each year, between January and March, on the Employers Recruitment Programme, to interview students interested in taking up employment with their organisations. Separate programmes of visits for recruitment into chartered accountancy and actuarial work are arranged for the Autumn term. Full details of these programmes are circulated to final year students.

- Alumni associations

The City University Society provide a means through which former students can keep in touch with the University and with one another. The Society comprises everyone who has been a registered student at the University for at least one year. It largely operates through a number of collaborating organisations, including Convocation and various departmental alumni associations. It aims to provide a network for friendship and support; opportunities for individuals to use City University for their continuing professional development; and ways to contribute to the life of the University. In some of the technical higher education institutions in Lithuania, alumni associations are in an embryonic state. They could play a much more important role in university-industry co-operation.

The Parliamentary and Scientific Committee

The Parliamentary and Scientific Committee is a unique scientific forum in the UK. It is an influential link between academia and industry, the houses of Parliament, the European Community and the European Parliament. It is an all-party group that has the promotion of an effective forum of discussion between parliamentarians and scientists as its objective. It publishes *Science in Parliament*, the journal of the Parliamentary and Scientific Committee.

The Lithuanian Parliament (Seimas) select Committee on Science and Technology consists of 17 members.

The Council for Industry and Higher Education

The Council for Industry and Higher Education is an independent body made up of thirty-three heads of large companies and twelve vice-chancellors, and heads of colleges. The Council believes that business and higher education must learn to work closely together, and that company managers and academics

should find space on their own agendas for the other's concerns. A promising method is the setting up of degree and diploma courses planned, directed, taught, assessed, equipped and paid for jointly by companies and universities. The Council therefore commissioned a study of powerful examples from the widening variety of such collaborative courses.

Institution of Mechanical Engineers (IMechE)

The Institution of Mechanical Engineers plays a vital role in the education, training and professional development of mechanical engineers and act as an international centre for the development and transfer of mechanical engineering technology. It is one of the largest engineering institutions and offers the broadest and most adaptable qualification. The scope of its activities is continually adapted to the needs of industry, education, training and management.

LINK- Collaborative Research Scheme

The Scheme aims to accelerate the commercial exploitation of Government funded research and focuses upon advances in science and engineering that have particular commercial promise. The initiative stimulates collaboration between partners from industry and research community to work together on projects in key scientific areas and assists the development of new products, processes and services. LINK resources are concentrated in a series of programmes, each addressing a particular area of science and technology and consisting of a portfolio of collaborative projects. Overall, government support is normally available to 50% of total eligible project costs. The scheme is of great interest to Lithuanian universities as it offers new research directions, funding and an industrial focus. For industrial companies it offers access to a wealth of scientific expertise and an opportunity to safeguard future profitability through innovation. LINK aims to bridge the gap between the research base and industry.

What is especially applicable to Lithuania's economic situation is that companies of all sizes and from all sectors of industry are encouraged to take part.

Teaching Company Scheme (TSC)

The Scheme offers academic departments that have a significant and continuing research base the opportunity to apply and refine their knowledge in an industrial environment. The academics involved have to be receptive to the needs of industry and commercial requirements. Commitment and motivation are the keywords. The advantages of TSC for the individual academic and the participating department are both

qualitative and quantitative. Universities with an established research base are enabled to extend their postgraduate and post-experience training capability beyond the classroom and laboratory into operating companies often with manufacturing facilities. TSC programmes provide a test-bed for the application and refinement of academic ideas.

Senior Academics in Industry Scheme

The Scheme provides the opportunity for senior academics to gain industrial experience by working on technological projects in UK companies. The Scheme supports projects that are strategically important to the companies concerned, and that depend on the senior academic committing at least four days per week to working on the company's premises for a period of between three and six months. The Scheme:

- makes academic expertise directly available to companies;
- increases Higher Education's understanding of industry's needs; and
- increases industrial investment in innovation.

Thus a company is able to draw on the advanced knowledge and skills of the senior academic and the facilities at his/her institution in carrying out a strategic development project. The senior academic has a valuable opportunity for self-development and the satisfaction of applying knowledge and ideas to practical industrial problems. The experience will lead almost inevitably to a reappraisal of knowledge, new ideas for research and material for teaching, and a lasting relationship with the company. All parties stand to gain from the improved academic-industrial collaboration and understanding brought by the collaboration. This may lead, for example, to joint research projects, consultancies, student placements and case studies. This experience could be directly applied in Lithuania to intensify university/industry co-operation.

The Engineering and Physical Sciences Research Council

The organisation funds both basic and strategic research, to a balance of 40% basic and 60% strategic. Increasing emphasis is given to industrially relevant engineering training. The Council is committed to encouraging interdisciplinarity between the science and engineering base and industry. Specific targets include:

- developing existing interdisciplinary programmes in clean technology, global environmental research and materials;
- launching a multidisciplinary initiative in manufac-

turing, encompassing activities in engineering, technology, science and materials; and

- establishing new areas where an interdisciplinary approach would be of particular value, and developing specific programmes.

The Council is improving the transfer of knowledge between the science and engineering base and industry. This is a two-way process: not only does the science and engineering base provide sources of new ideas for application, but applied research and development also generates new requirements for basic science and technology. Close interaction will be encouraged and the process by which new ideas are recognised and taken up will be enhanced.

THE TECHNICAL UNIVERSITY OF DENMARK

The Technical University of Denmark is of great interest to Lithuanian educational institutions due to the fact that Denmark and Lithuania have many things in common: population, area, even some traditions. In Denmark, science and technological R&D is organised into three types of institutions whose activities are based wholly or partially on government subsidies:

- Universities and institutions of higher education
- Research institutions
- Technological service institutes

Most interesting for Lithuania are the private independent institutions, the objectives of which are:

- to gather, process and communicate technical and other types of knowledge of importance to the development of trade, industry and society;
- to perform paid research, development and service tasks for private and public enterprises.

Now the institutes themselves are developing into leading centres of excellence within clearly defined areas of R&D, a change that reflects the ever closer, direct interaction between universities and enterprises, aimed at rapid translation of new research results into industrial applications.

LITHUANIAN UNIVERSITY/INDUSTRY PROGRAMMES OF COLLABORATION

The following detailed programme of collaboration between the higher technical universities and industry has been developed, and was presented for discussion to the Science Council of Lithuania, representatives of the Science and Education Ministry, the Lithua-

nian Academy of Sciences, all technical universities and industry.

At the government level

- Issue legal acts and documents, stimulating collaboration between universities and industry.
- Define collaboration between technical universities and industry as one of the priorities of running international collaboration projects.
- Reduce taxes for enterprises that have invested money in collaboration with universities both in research and study (eg employing students in sandwich courses).
- Eliminate the taxes for foreign investments directed at technology transfer and education.
- Organise and provide funding for a *Senior Academics in Industry Scheme*, in which senior academics work for 3-6 months on technological projects in Lithuanian companies.
- Organise and partly finance a *Teaching Company Scheme*, a three way partnership: graduates-industry-university.
- When financing universities an incentive must be given to those institutions that undertake industrial research. The same applies to financing separate research projects.
- Introduce *The Presidents Award for Technological Achievement*, the highest honour that can be bestowed on a Lithuanian company. To win the Award, a company must show a significant advance leading to increased efficiency in the application of technology to a production or development process in Lithuanian industry or the production for sale of goods that incorporate new and advanced technological qualities. One of the judging criteria must be the level of collaboration with universities.

At the university level

- Introduce a *Year in Industry Scheme* for students (thin or thick sandwich courses) and a *Scheme for Visiting Professors*.
- Implement a government financed *Senior Academics in Industry Scheme* and *Teaching Company Scheme*.
- Intensify the activity of Alumni associations.
- Create university careers and appointments services, providing students with information and advice about job opportunities and occupations.
- Organise, within the universities, an *Association*

of *Consulting Engineers*, entailing investigation, research, planning and design.

- Actively encourage professors and research staff undertaking industrial research (complementary roles of university and industry).

At the enterprise level

- Develop spin-off companies, comprising both university and company staff.
- Stimulate joint research with universities, use of laboratories and other facilities.
- Continue engineering education: interdisciplinary aspects and training for innovation, creativity techniques for individuals and groups; feedback from training and education.

One of the outcomes of discussion about the programme are suggestions from the Science Council of Lithuania for the Government on technical science, applied research and stimulation of innovation. Some of them are:

- To consider the possibility of establishing an applied sciences and innovative technologies support fund to cover up to 50% of the expenses of companies ordering research and technologies.
- To have the Ministries take measures to ensure the completion of a larger proportion of research and design work undertaken by Lithuanian scientists and institutions when executing the *PHARE 1996-1999* programme.
- To consider the possibility of amending the bill of profit taxes of juridical persons to exempt from tax the part of company profits used to finance applied science research when it is carried out in science and academic institutions.
- To prompt companies to establish non-profit innovation centres and other similar institutions that would finance the development of innovative technology or the design of new production.
- To consider the possibility of having the Ministry of Education and Science co-ordinating R&D financed by the budget.
- To consider the possibility of making one of the Ministries (preferably the Ministry of Education and Science) responsible for the development of technology and co-ordinating all of the initiatives of Ministries, work and foreign support in this field. A Centre for the Development of Technology should be established within the Ministry for collecting information and co-ordinating various programmes that can influence the technological evolution of

Lithuania, including international projects (*EU-REKA, COPERNICUS, FRAMEWORK IV, ESPRIT, PHARE, NATO, COMMET*, etc).

- To make all necessary changes to eliminate taxes for research and study institutions for manufacturing and publishing, for obtaining scientific, training, and experimental equipment, obtained by support, charity and other ways.
- To call attention to government ministries and departments that ordering equipment from Lithuanian enterprises would stimulate the technical sciences and innovative activities in the country.
- To propose that the Standardisation Department of Lithuania establish export production certification centres in the universities and research institutions, using their laboratories and equipment. The incomes of these activities should be used for improvement of the research and study base.
- To propose that ministries invite State Research and Education institutions to adopt the EC directives and to establish the corresponding Technical Committees.

It is hoped that these measures lead to a synergy in research, training and economic development. It is also hoped that these endeavours will finally result in the formation of a new generation of knowledgeable and enthusiastic about business.

CONCLUSIONS

The technical universities of Lithuania are successfully undergoing a process of restructuring and are establishing the necessary divisions and services for training graduates and expanding collaboration with industry under the conditions of the market economy.

Lack of funds, insufficient analysis of the needs of science and graduates and the absence of priorities in science development in the country are now the main problems.

The experience of EC countries in realising collaboration between universities and industry is of great interest to Lithuanian institutions. The programme of collaborative development was suggested on the basis of analysis of this experience and has been developed further.

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BIOGRAPHIES



Professor Ramutis Bansevicius gained a first degree in production engineering at the Kaunas Polytechnic Institute, and stayed on to gain Dr and Dr Habil degrees. He has spent periods as a Visiting Professor or Research fellow at the Politecnico di Milano, Italy;

City University, London; Aalborg University, Denmark and De Montfort University, UK, working in the fields of the dynamics of precise mechanical systems. He is currently a professor in the Kaunas University of Technology, Chairman of the Senate and Chairman of the Division of Technical Sciences of the Lithuanian Academy of Sciences.

Professor R. Bansevicius is the author of 150 scientific papers, 300 USSR inventions, twelve patents in precision mechanics and five books, written with co-authors.



Rymantas Tadas Tolocka graduated from Kaunas University of Technology with honours in 1966 and received his doctorate in Mechanical Engineering in 1977 from the same university. Since 1967 he has been working in Kaunas University of Technology as an assistant professor, postgraduate student, and research fellow.

Presently he is an associate professor in the Department of Engineering Mechanics. His research interests include adaptive mechanical systems, dynamics of mechanical systems and mechanism synthesis. He is the author of more than eighty scientific papers, twenty USSR inventions, one patent, textbook on theory of machines and mechanisms and monograph written with co-authors.

Proceedings of the 1st UICEE Annual Conference on Engineering Education

edited by Peter LeP. Darvall and Zenon J. Pudlowski

The Proceedings of the *1st UICEE Annual Conference on Engineering Education*, under the theme *Globalisation of Engineering Education*, held at Monash University, Clayton, Melbourne, Australia, between 11 and 14 February 1998, is the fifth publication in the *Monash Engineering Education Series*. The aim of this series is to provide opportunities for engineering educators to share their achievements with their colleagues and to transfer information on a worldwide basis.

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