



**EUA (European University Association)
Institutional Evaluation Programme**

BRNO UNIVERSITY OF TECHNOLOGY

EUA EVALUATION REPORT

September 2005

TABLE OF CONTENTS

Forward	3
Introduction	3
Constraints and Institutional Norms	6
Autonomy	7
Strategic Management: mission, vision and strategy	8
Quality Assurance	9
Governance and Administration	12
Finances	13
Capacity of Institutional Change	
Teaching and Learning: Study Programmes, Student Care	15
Research	18
Internationalization, Bologna Process	20
Envoi	22

1. Foreword

The EUA Institutional Evaluation Programme was launched eleven years ago with the aim of preparing universities to meet the emerging needs for external accountability by an increased capacity for both strategic thinking and internal quality culture. To date more than 140 universities from 36 countries have participated in this program and some have subsequently asked for follow-up visits to monitor progress made. In 2004 the EUA evaluated simultaneously all seven Irish universities, and is presently evaluating all universities in Catalonia. Previously all medical faculties in Portugal were evaluated.

While the evaluation is focused on the institution as a whole a university may select an additional focus. Brno University of Technology (BUT) requested a focus on the strategic management of the university, with additional special interest in developing (i) the quality of study programmes and (ii) relations between the university and society.

The goal of the review is to offer to the university an external diagnostic by university leaders who have experience of different higher education systems in Europe. This diagnostic considers the quality issues and the main actors in the university's daily decision-making process. The EUA does not wish to provide the university with a blueprint for its development; rather the review process is consultative and should be seen as a tool to help institutional leaders as they prepare for change.

By reviewing institutions in different countries the EUA hopes to disseminate examples of good European but also international practice, to validate common concepts of strategic thinking, and to elaborate shared ideas on quality that will help member universities to reorient their strategic development while strengthening a quality culture in Europe. During the review the university is helped to examine how it defines its medium and long term aims, to look at the external and internal constraints shaping its development, to discuss strategies that will enhance its quality while taking account of these constraints.

The EUA Review Team for the Brno University of Technology consisted of

Professor Alojz Kralj, former Rector, University of Ljubljana, Slovenia (Chair)
Professor Erdal Emel, Vice Rector, Uludağ University, Turkey
Professor Lothar Zechlin, Rector, University of Duisburg- Essen, Germany
Professor Don McQuillan, Former Chief Executive, Irish Universities Quality Board, Ireland (Secretary).

2. Introduction

The Review process consisted of several phases. The University first produced a Self-Evaluation Report (SER) prepared by the Self-Evaluation Group. The Group consisted of twelve members headed by vice-rector Professor Karel Rais. Membership consisted of teacher and student representatives, university and faculty leaders, economic and administrative management as well as representatives of the Academic Senate. Under the general direction of Rector Professor Jan Vrbka the university organised the self-evaluation process very carefully

with the involvement of task forces and the co-operation of a large part of the academic community.

The report arrived in good time, was well written and was a valuable source of information for the Review Team. It included an excellent SWOT analysis which should prove to be a firm foundation for the university's 2006-2010 strategic plan. The Team was disappointed that the SER did not appear to have been widely noted or studied across the university. Indeed of the people we met in the Faculty of Information Technology only the Dean was familiar with the report.

In its introduction the SER explains the reasons for the University's participation in the EUA evaluation programme:

- There is a need for an outside independent view of the university's achievements
- An outside independent evaluation will contribute to more systematic and long-term work on the preparation of the strategic plan for the period 2006-2010
- To put BUT into harmony with universities in other EU countries, and consequently identify the strategic position of the university among European universities
- To develop long-term co-operation with the EUA. In this connection the review team notes that BUT was appointed as the only representative of the Czech higher educational system to take part in the EUA research relating to the implementation of the Bologna reforms within the Czech educational system (Trends IV).

In addition the university management anticipates that this outside evaluation will help increase the interest in the university of Czech and international students and of academics and companies from abroad.

The Preliminary Visit took place on 9-11 March 2004. This enabled the Team to become acquainted with the University, with initial discussions centred in the areas of

- Autonomy
- Strategic Planning
- Evaluation and Quality Processes
- Organisation and Governance
- Internationalisation
- Resources
- Capacity for Change

as well as identification of areas for more detailed questioning during the Main Visit.

Subsequently the Team requested and received further information and documentation in several areas including funding formulas at Ministry, University, Faculty and Department levels, criteria for appointment and habilitation, national and regional population trends, the activities of the Office for External Affairs, interdisciplinary initiatives, students' performance, doctoral programmes, publications for which external funding was received, and updates on some outdated data. The Team is highly appreciative of the efficient work done in the preparation and translation of the requested documents.

The Main Visit took place on 29 May-1 June 2005. During the two visits the review Team met the rector, the self-evaluation team and representatives of the various task forces, vice-rectors, deans of faculties, senior administrators, members of the central office staff, directors of support units including the library and centre for computer and information services, staff from a number of support units, representatives from the Academic Senate and the Student Association, staff and students of many faculties, and representatives of external stakeholders. The members of the Team visited seven of the eight faculties.

The meetings were always helpful, friendly and frank. Throughout the University the goodwill and strong commitment to excellence were always in evidence. It was clear that the process of self-evaluation had been very open and extensive because it was usually not necessary to explain our presence and the goals of the evaluation since they were well known in advance.

On the final day of the Main Visit the Team presented the oral report indicating the principal conclusions and recommendations to an audience that included University leaders and representatives of the Student Association. This written report is a full exposition of these conclusions and recommendations.

We would like to acknowledge warmly the co-operation and hospitality we received throughout the two visits. We thank the rector Professor Jan Vrbka, who signed the invitation letter to the EUA, the vice-rectors and deans, who actively supported us during our two visits, and all the staff and students, as well as stakeholders from outside the university, for their helpful contribution to our open discussions.

We wish especially to thank Professor Karel Rais and Dr Stanislav Škapa for their efficiency in organizing the documentation, liaising with the review team and maintaining our daily schedule, no easy task in a large multi-campus university. We trust that our joint efforts will together provide a sound springboard for the University as it moves into the next phase of its evolution.

3. Constraints and Institutional Norms

3.1 Profile of the University

The Brno University of Technology was established in 1899. The university offers a wide range of technical disciplines in the Faculties of Civil Engineering (FCE), Mechanical Engineering (FME), Electrical Engineering and Communications (FEEC), Information Technology (FIT) and Chemistry (FC), as well as economic and arts disciplines related to technology in the Faculties of Architecture (FA), Fine Arts (FFA) and Business and Management (FBM). BUT has always ranked among the leading technical universities in the Czech Republic, a fact reflected by its membership in the elite university association CESAER.

In 2003 there were 48 accredited bachelor, master and doctoral study programmes with 136 study areas. In accordance with the Bologna Declaration the shift to the three-tier system was completed in 2003 with the accreditation of the study programmes of the FCE.

The university is located in three campuses, Brno-north, Brno-south and Brno-centre. In addition the FME offers three part-time bachelor degrees programmes outside Brno. The buildings visited were of a very high standard and the Team commends the on-going work of the university in refurbishing and further developing its infrastructure. The three campuses are fairly distant from one another and in our discussions in some faculties this fact was sometimes offered to explain a lack of enthusiasm in promoting cross-faculty co-operation and interdisciplinary initiatives.

In academic year 2004/2005 the number of students in the university increased from 17,561 the previous year to 18,272. Of this number 1,919 were postgraduate students, 14,751 were male and 3,521 were female. The university has decided to cap the number of students at 20,000. In all faculties BUT has at least two applicants for each available place, a good indication of the competitiveness and standing of the university among students and society at large. Counting full-time equivalents the teaching staff consists of 89 professors, 252 associate professors, 450 senior lecturers and 156 lecturers, giving a student:staff ratio of approximately 19. This is reasonably low by international standards and gives scope for effective overall improvements in the area of teaching and learning.

Based on the evidence provided to the Team the university is carrying out internationally recognised outstanding research in many areas, including aerospace, light aircraft design, advanced polymers and composites, nano-ceramics, satellite communications, image processing, advanced flow research and environmental technologies.

While the EUA evaluation is not directed at validating research or teaching and learning, nevertheless the Team's impression, obtained through numerous interviews and discussions during the two visits, is that BUT is achieving a high standard in both education and research, and that its high reputation is fully justified. In our discussions with students and staff we were impressed by a clear dedication to excellence in all activities of the university.

This impression was further strengthened during our meetings with a large number of representatives of local enterprises and organisations. It seems clear that the graduates of BUT have a strong reputation for the quality of their training and their technical expertise. They are widely employed, and indeed sought after, by local employers. According to the SER the average total period of unemployment of BUT graduates is two months, while 95% of them find their first job within six months of graduation. A recent survey showed that 84% of graduates are employed in the private sector, with 47% in private Czech firms. Nearly half are employed in the industrial sector and nearly a third in the service sector.

BUT co-operates with the other five universities in the city, as well as with the city authorities and the Southern Moravian Region, in developing and driving local initiatives. This has led to the establishment of the South Moravian Innovation Centre, a consortium designed to promote the development of small and medium-sized enterprises, and the Brno Centre for European Studies.

3.2 Autonomy

According to the SER the activity of the university is based on the Higher Education Act of 1998. It appears that the university enjoys a measure of autonomy comparable to that enjoyed by many institutions in Western Europe. Indeed it has autonomy in several key areas, such as:

- organising its internal structure
- appointing teachers and other personnel
- enrolling students in accordance with the national system
- managing finances within the university
- organising international and national cooperation and exchanges, research initiatives and activities
- generating income from research and other activities.

Study programmes are subject to accreditation by the Accreditation Commission of the Czech Republic. The final decision on whether to grant accreditation is made by the Ministry of Education. While this system of accreditation is common in parts of Europe it is by no means the norm internationally. Although it meets to a limited extent the need for the university to be accountable to society for the quality of its study programmes, it is a very limited instrument. We shall discuss this further in the section on quality assurance.

The EUA supports strong university autonomy. The modern university finds itself in a rapidly changing environment and facing challenges that are by now well known: increased competition for scarce resources, massification of education, economic globalisation with the resulting demands from government and society for more and better trained graduates especially in the sciences, the need to establish improved research capabilities for assisting/underpinning national competitiveness. Autonomy is a necessary prerequisite for speedily responding to these challenges.

On the other hand it is well recognised in European universities that university autonomy is bound up with accountability to society, and that accountability brings with it the responsibility

to drive the required change and improvement. Thus universities must use their autonomy and independence for positive strategic development and involvement with society according to its expectations and needs.

The EUA in its Graz Declaration states that 'higher education remains first and foremost a public responsibility so as to maintain core academic and civic values, stimulate overall excellence and enable universities to play their role as essential partners in advancing social, economic and cultural development. Governments must therefore empower institutions and strengthen their essential autonomy by providing stable legal and funding environments. Universities accept accountability and will assume the responsibility of implementing reform in close co-operation with students and stakeholders, improving institutional quality and strategic management capacity.' The Team urges BUT to keep these in mind when considering its strategic plan and the recommendations for improvement contained in this report.

3.3 Strategic management: mission, vision and strategy

The university requested that 'strategic management of the whole university and their individual parts' should be a special focus of the EUA evaluation. In addition BUT is required by law to prepare a new strategic plan for the five year period 2006-2010.

The SER provides a solid basis for the preparation of a strategic plan by including a comprehensive and detailed SWOT analysis, a frank listing of the university's strengths and weaknesses together with the opportunities and threats confronting it in the medium to long term. The methodology used in the development of the SWOT was excellent. Each faculty consulted with staff and prepared a SWOT which was then submitted to the SER Steering Committee. On the basis of the eight faculty submissions the Committee drew up a draft university SWOT which they finalised following wide debate within the university. The university has decided that the members of the Self-Evaluation Team will be responsible for the preparation of the strategic plan, a decision which the team fully endorses since it will provide continuity in this important endeavour.

Strategic planning has been described as 'the continuous and collective exercise of foresight in the integrated process of taking informed decisions affecting the future'. It is essential that the university understands what is involved in the preparation of a strategic plan. A strategic plan is not a wish list, a mere collection of desirable outcomes with no thought given as to how these outcomes can be achieved. On the contrary, the process of developing an effective strategic plan is complex and intensive.

Three basic questions to keep in mind are the following:

Where is the university positioned now?

Where does the university want to go?

How does the university get there?

The first question has been answered to a great extent in the SWOT analysis as set down in the SER. However it is important to emphasise that planning is a continuous process. Thus the plan itself and the SWOT on which it is based must be updated on an ongoing basis. This requires solid data to support conclusions and to position the university to meet new developments. The

team recommends that BUT establishes a central unit for the collection of data on all its activities. Such a database will serve the university well.

The second question addresses the vision and mission of the university, and the detailed objectives to be achieved in the period 2006-2010 based on the SWOT analysis. We note that the SER does not contain a vision statement, while the mission statement seems rather bland and could apply to many other institutions. We urge the university to give its close attention to formulating statements that more clearly reflect BUT's aspirations at faculty, university, national and international level.

A sense of ownership of the strategic plan throughout the university is essential to the success of the process. This could be achieved using the methodology already adopted in the preparation of the SWOT analysis. In the first instance each of the eight faculties might prepare an agreed plan based on contributions from the individual departments. These plans could then be confronted with the university's vision and aims, and harmonised by the steering committee to produce an overarching strategic plan for the whole university. The plan should be discussed widely, and then finalised and approved by the competent governance bodies.

The third question asks for details on how the university will achieve its stated objectives. This is a complex and difficult task involving as it does repeated top-down and bottom-up debate within the university. Inevitably there will be competing agendas, and tension between the various elements of the university. No university finds it easy to arrive at the type of institution-wide consensus that is required if such a process is to have an effective and fruitful outcome. University and faculty leaders will play a vital role in bringing doubters along and in creating the conviction that the task is worth the effort.

Good organisation and agreed procedures are essential. The objectives should be prioritised, and each objective should be stated in a clear and unambiguous way. An action plan for the successful achievement of each objective should be established, responsibility for completion assigned, and allocation of required resources agreed. Each objective should have a time frame for completion and precise indicators of success should be set down beforehand.

While no one should be under any illusion regarding the difficulties inherent in the above process, experience elsewhere indicates that the University that carries through this task successfully, and mobilises its staff behind the effort, improves its overall performance, and by focusing on agreed goals makes better use of scarce resources, operates more efficiently, and is better positioned to face external competition.

3.4 Quality Assurance

The team discussed quality assurance with university staff and students in light of the information given in the SER. The Accreditation Commission of the Czech Republic conducts external reviews of study programmes for the purpose of accreditation. As we understand the process the result of the review is a report that delivers a simple yes or no verdict on whether the programme achieves agreed minimal standards, and may include suggestions for improvement.

Internally there is a teaching evaluation system which is also a legal requirement. However the procedure is entirely summative in nature and is used only for purposes of determining retention, promotion or salary. There is also an internal evaluation of study programmes but this does not seem to be systematic. In addition the students evaluate teachers and courses via questionnaires but again, according to students we met, this process appears to be sporadic with little or no follow-up or measurable effect on university performance. The SER notes that 'an electronic version of a sole questionnaire to be adopted throughout the university is currently being prepared.' However an organisation unit that would be responsible for, support and care for the entire system of evaluation of the quality of teaching does not exist at the university.

A further external measure of quality is provided by regular meetings between the university leadership and managers of leading industrial companies, where the knowledge and skills required of BUT graduates in the labour markets are discussed. The information obtained may contribute to the creation of new study programmes. In addition representatives of the industrial sector forward their opinions on the research activities of the university.

The quality of higher education has emerged as a key element in the establishment of the European Higher Education Area, national progress and competitiveness, and therefore quality assurance is one of the main action items of the Bologna Process. In the Berlin and Bergen Communiqués the European Ministers of Higher Education committed themselves to supporting further development of quality assurance at institutional, national and European level, and stressed the need to develop mutually shared criteria and methodologies on quality assurance.

They also stressed that the primary responsibility for quality assurance in higher education lies with each institution itself and this provides the basis for real accountability of the academic system within the national quality framework. They agreed that the national quality assurance systems should include evaluation of programmes or institutions that would involve internal assessment, external review, participation of students and the publication of results.

The EUA proposes a coherent QA policy for Europe, based on the belief that institutional autonomy creates and requires responsibility, that universities are responsible for developing internal quality cultures and that progress at European level involving all stakeholders is a necessary next step. With the active contribution of students, universities must monitor and evaluate all their activities, including study programmes, research productivity, innovativeness, competitiveness, management, funding systems and services.

The procedures must promote academic and organisational quality, respect institutional autonomy, develop internal quality cultures, be cost effective, include evaluation of the QA agencies, minimise bureaucracy and cost, and avoid over regulation. External quality assurance procedures should focus on checking through institutional audit that internal monitoring has been effectively done.

For the EUA, as for the Ministers of Education, the key elements in a QA process are:

- self-assessment by the unit being evaluated

- review and site visit by peers including external peers
- publication of the peer review report
- effective follow-up on recommendations for improvement
- minimal bureaucracy
- quality improvement
- involvement of students and other stakeholders.

We refer to two publications:

'EUA's Quality Assurance Policy in the Context of the Bergen Communiqué',
'Standards and Guidelines for Quality Assurance in the European Higher Education Area'
(ENQA Report).

Given that the Czech Republic is a signatory to the Berlin and Bergen Communiqués, and that BUT is a member of the EUA, we suggest that the university establish an internal QA system based on the above principles. This should be a central component of the university's strategic plan.

The establishment of such an internal system of quality assurance takes time and commitment, and there may be an initial reluctance on the part of some staff to face the challenge of change or even to accept that change is necessary. Dialogue between all members of the university community is central to creating good will, if not total and enthusiastic acceptance. It should be stressed that the goal is to create a quality culture in all activities of the university through continuous improvement, and not to apportion blame for perceived shortcomings.

Again the role of the university leadership is crucial in driving the process and in facilitating the missionary work necessary to convert the doubters. To ensure coherence and harmonisation across the university the guidelines and operational procedures for this important work should be agreed at university level and a central unit established to organise and oversee the details of the procedures.

In addition to this comprehensive quality assurance process the team urges the university to organise at once a systematic and routine procedure for the evaluation by students of teachers and courses. Feedback to students on the results of these evaluations should be timely, and follow-up procedures agreed. It is crucial that this process should be formative and directed at improving the quality of teaching and learning. It must never become a blame game. This can lead to a continuing dialogue between teachers and students, an important element in developing a climate where real improvement can take place. Staff development is closely related to the points considered here and we will return to this topic when we consider Teaching and Learning.

Other procedures affect the quality of performance at BUT. These include the appointment of new staff, the quality and number of the entering students and the related issue of their formation and motivation. The staff to student ratio in the university is relatively low by standards elsewhere, and the student drop-out rate in most faculties appears to be acceptable. The university is satisfied with the overall quality and preparation of incoming students, and the demand for places far exceeds the number of places available. However given the

population trends in the Czech Republic it is likely that competition for the best students is likely to become a factor, and in that scenario it is perhaps worth noting that the university with an outstanding reputation for its quality processes may well have an advantage. The team met with students during both visits and was impressed by their energy, enthusiasm for their studies and easy command of the English language.

The procedures for appointing professors appear to be quite open and transparent and totally in the hands of the university. It is important that this important element of autonomy is maintained and that procedures are scrupulously applied. However we were told there is a problem in attracting first class candidates for positions because of the uncompetitive salary structure. This is a serious quality issue for BUT, bearing as it does on the future development of the university and on the formation of the young men and women on whom the future of the country so vitally depends.

There is the related issue of the age distribution of the academic staff. While this is an obvious threat to the future pedagogical and research development of the university it presents at the same time an opportunity to direct the future development of the university by the infusion of new blood.

3.5 Governance and Administration

The Higher Education Act provides specifically for five bodies and individuals: the Academic Senate, the Rector, the Scientific Board, the Board of Trustees and the Bursar. The Academic Senate is the university's independent representative body and is elected by the university community including the students. By law at least one third and at most one half of its members must be students. At BUT the Academic Senate consists of 24 members; each faculty has three representatives, of whom one is a student.

The rector is the head of the university and appoints the vice-rectors, the bursar and the scientific board. The rector's term of office is three years with a limit of two consecutive terms. The scientific board is made up of leading academics at least one third of whom come from outside the university. The board discusses and approves degree programmes and carries out procedures for the appointment of professors and for granting habilitation. The Board of Trustees is appointed by the Minister on the recommendation of the rector and includes representatives from public life as well as the state administration. Its role is mainly supervisory and advisory though it also approves a range of legal acts on behalf of the university. The internal organisation in each faculty reflects that in the university, and the dean is the head.

Other key bodies include the Rector's Board consisting of the rector, vice-rectors, bursar, all deans and the head of the academic senate; the Bursar's Wider Secretariat consisting of the bursar, the faculty bursars and representatives from other units. There are various other advisory boards and committees.

The Academic Senate plays a key role in the life of the university and has wide powers. It

Approves the university's internal regulations

Approves the university budget (presented to it by the rector)

Supervises how the university's financial resources are employed

Approves the long-term plan and its updates

In addition the rector is appointed and dismissed by the President of the Czech Republic upon a proposal of the academic senate.

The Team understands that these powers are provided by law and that the system is based on strong democratic principles. Nevertheless we feel that some comments may be relevant and useful when these matters come up for discussion. We note first that in our meetings with staff and students we were told that very small numbers of students actually vote in the elections to the Senate and that few senior academics present themselves for election. Indeed currently there is only one professor on the Senate. We wonder if this low participation rate in the electoral process at bottom and top levels is a reflection of a malaise that needs to be considered. How does the senior academic staff influence the university governance and decision-making? Are the provisions in place adequate to ensure the effective use of all available expertise?

The Academic Senate has wide-ranging and extensive powers in the key areas of academic, financial and management affairs of the university. The Team notes for the information of BUT that there is a movement in many universities towards a US governance model in which the academic senate and governing authority have different roles, thus avoiding a clash of interests and making full use of the expertise of the members of both bodies to best advantage. In this model the governing authority corresponds roughly to BUT's Board of Trustees, but with wider representation and appropriate responsibilities.

Given the number and variety of official and unofficial groups contributing to the decision-making process in the university the Team asks if BUT is sometimes unable to respond rapidly enough to the challenges facing the modern university that we outlined above. The need for consensus in such an extensive consultative procedure may lead to delayed decisions and compromises that are ultimately inimical to the best interests of the university. The Team feels that by exploiting the opportunities left open in the Higher Education Act the university can accelerate its decision-making procedures in order to face the challenges posed by a globalised society and economy.

The historic development of the university has created a situation where great independence is devolved to the faculties, with a corresponding diminution of power at the centre. The dean of one of the faculties we visited suggested that his faculty did not need the centre. Again the team feels that this situation may leads to problems when the university needs to respond rapidly to new situations and challenges. The Team suggests that the centre of gravity of BUT should move towards the centre.

3.6 Finances

Education funding from the Ministry of Education for the year 2005 amounted to approximately Euro 33,312,000, of which 30% went to the rector's office and 70% to the faculties. Research funding from the Ministry amounted to Euro 3,767,000, of which 9.5% went to the rector's office in overheads and 90.50% went to the faculties. The faculties pay the salaries of staff. Funding has shown a steady overall increase since 2002. The rules for

distribution of funding to individual departments vary from faculty to faculty but in all cases are transparent (source: Amendment to Self-Evaluation Report). Smaller amounts were obtained from other ministries and national research agencies, entrepreneurial activities by faculties as well as from the EU under the 5th and 6th framework programmes.

This system of distribution of ministry funds follows a general trend in Western European universities to transfer the responsibility of financing activities to a decentralised level, i.e. to faculties and institutes. This devolved financial responsibility has been an essential part of the so-called management by result system and is often considered the best way to develop internal accountability.

The SER refers to a 'certain degree of antagonism between academic and research staff resulting from the system of funding. The means granted for education are sometimes used to finance (or indirectly support) research, e.g. the laboratories intended for instruction are used for research'. This conflict should be resolved, perhaps in the wider context of the strategic plan.

For many universities, and particularly those in countries in transition, a major constraint is often a lack of recurrent resources for teaching and research, and of capital resources to provide new, and replace old, equipment. In the matter of capital investment BUT has fared well in recent years. All the newly established faculties are accommodated in new buildings of the highest standard, and laboratories in practically all faculties have been refurbished. An important development was the establishment of the Incubator as a BUT unit in 2003.

BUT, like all universities today, is trying to generate income from sources other than state budgets and student fees. The SER states that 'the management regards a further development of applied research as a great opportunity not only to the university's reputation but also to seek other sources of funding.' The Team commends such initiatives and encourages the university to pursue this and other avenues. Extra funding from external sources faces stiff competition and we shall return to this in the section on research.

Of course problems arising from under-funding will not be solved only by income generation. It is also necessary to make optimal use of existing resources and to make every effort to seek ways of reducing expenditure and to increase the cost/benefit ratio. In this context the Team draws the university's attention to the duplication of effort across the eight faculties in areas of administration, as well as some academic related activities like information systems, library organisation and the teaching of common core courses, such as mathematics and physics.

It may be of interest to note ways in which many universities around the world have generated extra funding, however modest, through making use of their academic expertise and their good will in the community.

Many universities have formed a University Fund Raising Committee to seek funding in a systematic fashion. These committees are often highly successful in attracting money to the university, and especially in obtaining support for special projects. Here the good will already established by BUT in the wider community could be important in attracting prominent people

of influence to serve on such a committee. This activity will also help to strengthen the external image and awareness of the university.

Another possible source of revenue is to be found in the area of continuing education, a theme mentioned in our discussions and already under way in some faculties. The university is already involved in joint research projects, both local and international, and we recommend that this important activity be continued and expanded. These activities are of course pedagogically and scientifically important in themselves, but can also be important sources of funding.

4. Capacity for Institutional Change

4.1. Teaching and Learning: Study Programmes, Student Care

BUT has speedily introduced several of the innovations recommended in the Bologna process. ECTS and the new 3-5 degree structures are now firmly established. A word of warning here. The introduction of the three-year bachelor degree can lead to problems for graduates of a technical university when it is achieved in a dangerously superficial way by simply making it the first three years of the old five-year degree. This can lead to graduates with strong theoretical knowledge but unequipped with the applied training expected of them in the labour market.

In talking to students we got the impression that some of them did not receive credit in BUT for the courses they attended abroad. Acceptance of credits earned abroad seemed to depend on the attitude of the department or professor involved. We urge the university to ensure that the ECTS process is rigorously applied.

Teaching and learning at BUT, and student care, should form a key element of the strategic plan. The plan should be clear on the goals to be achieved and the action plans necessary to realise the goals. This work should proceed in tandem with the speedy development of an overall quality assurance process, with the active co-operation of the students.

A starting point is to take account of the views of students. While the drop-out rate is reasonably low, and the percentage of students finishing the first and second cycle degrees within the prescribed time is satisfactory, there appears to be underlying issues that need to be addressed. In our discussions with students there was reference to lectures that were sometimes ex-cathedra with no student class participation, old-fashioned material in lectures, no required reading and a dependence on notes.

As we noted in the section on quality assurance there is no systematic attempt to elicit student opinion by means of questionnaires, and when questionnaires are used there is often no feedback from the teacher. Thus students find it difficult to have their views heard and discussed. While these tensions are not unique to BUT they do point to the need for an urgent re-assessment of the university's approach to the whole area of teaching and learning.

There is a need to adopt a new mindset, now common in many universities, with a move from a teaching oriented system of instruction to an emphasis on student learning. We urge the

university to proceed with the implementation of this important initiative. The reasonable teacher:student ratio in BUT should help to facilitate the process. Formal lectures should be reduced and augmented by well organized and supervised self-study and group-study assignments, by tutorials , workshops and an increase in project work.

Of immediate importance is the introduction of a formal system of student questionnaires for the assessment of courses and teachers, with feedback to students that is timely. The process should be supportive and formative and lead to a continuing dialogue between teachers and students. As we noted earlier it should never be used to apportion blame for perceived weaknesses. It is an important element in developing a climate where improvements can take place. This will also have a long-term positive effect on the process as a whole since students will become convinced that their views are being taken into account.

Some students felt that the first years of their course were too theoretical, and the SER notes that after graduation 'they experience the consequences of the deficit in practical training.' They are also 'painfully aware of a lack of language skills, and the skills of winning one's place on the labour market.' Some students we spoke to would like to see courses for credit available in communication and presentation skills. They would also like to develop their skills in other European languages as well as English. The university is aware of the need to prepare the students for the 'real world'; we commend their efforts in this direction and urge BUT to continue and expand on this good work.

Staff development is central to the points considered here. The SER notes that 'systematic training of primarily newly recruited staff is a key factor of the pedagogical process. This training significantly improves the quality of teaching. However BUT lacks a more systematic framework for teaching quality control.' We stress that it is of the utmost importance that training in teaching and modern presentation should be available to the teaching staff. This is particularly true of teachers who have been working in the non-university sector and come to teaching later in their careers. The new emphasis on learning will highlight the necessity to provide guidance to staff members in new methodologies, in modern methods of communication, and in mutually beneficial interaction with students. The introduction of an effective sabbatical system for staff, allied with an exchange programme with foreign scholars, will be helpful here and provide useful benchmarking on international practice. This will require a structured approach, good organisation, and systematic funding. We therefore urge the university to establish a special unit with responsibility for staff development and training, as well as various support services in relation to new and experimental ways of teaching/learning.

Modularisation of courses is a development which if used to full advantage can have a profound effect in many areas of university life. Of course the introduction of modularisation is well advanced in some of the faculties and we urge the university to proceed with the full implementation of this course structure. Modularisation will influence many of the developments planned by the university. At postgraduate level it will simplify the structuring and organisation of interdisciplinary studies for both the students and the university, and indeed may point the way to new combinations of subjects for interdisciplinary and multidisciplinary work. At undergraduate level it opens up the possibility of a more effective

use of resources by identifying or indeed creating courses which could be regarded as basic or core courses for all or many students in different faculties.

In this context the Team congratulates the university on its decision to establish a central English Language Centre. We now suggest that serious consideration be given to the creation of central departments in core disciplines such as Mathematics and Physics. It is clear that at the moment there is much duplication in the provision of basic mathematics and physics courses across the faculties. Modularisation and centralized organisation would clearly be beneficial. In addition centralizing these departments would produce research synergies that are lacking at present.

The process of examining closely the desired outcomes of programmes and courses, followed by a breakdown into coherent modules, is a fruitful exercise in itself and by its nature contributes to a review of curricula. A clear and concise description of the content of each module, with a statement noting the required prerequisite modules, is a necessary element of the process.

Modularisation will also contribute to transparency in the University's dealings with students. We suggest that each faculty student handbook should include a description of the content of each module taught in each semester in each course, properly organised with prerequisite modules clearly indicated. The handbook should contain an explanation of the overall aims, learning outcomes and purpose of the courses on offer, benchmarks for student learning and achievements each year, clear guidelines on written and project work, principles on marking and feedback to students. Many universities now include a set of Student Rights and Responsibilities in their handbooks, and examples of these are easily found on the Internet.

The development of the action plans in the Bologna Process will be facilitated by a modularised course structure. Visiting students from abroad will be enabled to easily construct a study programme while the implementation of ECTS will be simplified.

We note from the SER that the university obtains feedback from leaders of companies for the purpose of upgrading existing courses and designing new ones. This is an excellent practice. The economy of a knowledge intensive society depends on the quality of its graduates. Employers are seeking graduates with qualities such as a willingness and ability to acquire new knowledge, to work in multi-disciplinary teams, to be flexible and open to new ideas, graduates with problem solving skills, information and communication skills, and the ability to be innovative.

These ideas are not new to BUT but we suggest that a systematic and coherent approach should be organized by setting up a Curriculum Committee to oversee the work. This approach has been used in other countries to very good effect.

We encourage the ongoing development of non-consecutive education, also known as continuous education, life-long learning and distance learning that are all part of BUT's plans. This can be seen as part of a worldwide focus on the role of universities in the creation of what

is being called a 'learning society'. The creation of the 'University of the Third Age' is a welcome innovation, and the Team notes that it is now in its sixth year and flourishing.

We would like to suggest that student care can extend to the life of the students beyond graduation. The University should consider a systematic process for tracking its graduates and creating a database on what they do, where they go, their opinion on teaching and courses, and so on. This would be mutually beneficial since it would maintain the link between the graduates and the university and at the same time provide valuable information for curricular reform and care of undergraduates. A University Alumni Association could be formed to maintain and fortify the contact with graduates and strengthen the good will in the community toward the University. This process of maintaining effective close contact with graduates embeds the University further in the community, and in turn will be helpful to new graduates in finding employment.

The Team is aware that BUT graduates have little difficulty in finding employment at the moment, but nevertheless it may be of interest to note that many universities have set up a 'Careers and Appointments' Office. The remit of this office usually includes the following: establishing contact between students and industry for the exchange of information on posts available and graduates qualified to take up the posts, helping students to prepare for interviews, inviting employers to speak to groups of senior students on employer expectations, arranging interviews, and building up a data base on its activities. This is another effective way to embed the University in the working life of the community and maintain contact with graduates and employers. In addition it will help in arranging and organising the internship programme.

4.2 Research

Research and development are core activities of the university and thus the strategic plan should contain a clear statement of BUT's goals in this important area and the action plans to achieve them.

BUT is an important contributor to international research activity at the highest level. We have already noted that several faculties carry out internationally recognised outstanding research in many fields, including aerospace, light aircraft design, advanced flow research, advanced polymers and composites, nano-ceramics, satellite communications, image processing, environmental technologies.

Research is funded from the state budget, grant agencies e.g. the Grant Agencies of the Czech Republic and the Academy of Sciences, the EU through the 5th and 6th framework programmes, etc. In 2003 international R&D programmes brought in approximately Euro 1,185,000, or about 3% of the budget, indicating that expansion, particularly in EU funded research, is needed and justified. A significant proportion of applied research is funded through co-operation with national and international enterprises, such as Škoda Auto, IBM, Honeywell and others.

Appendix VI-6 of the SER presents the publication activity of the university in 2003. Of the 3,490 publications listed only 483 appeared in specialised journals while 2,713 were papers in

conference proceedings. This performance must be improved significantly if research in BUT is to achieve the status necessary to compete in the present competitive climate and underpin the quality and competitiveness of doctoral studies, particularly in the international arena.. Membership of the European Union is presenting new and possibly lucrative research funding opportunities, but success will depend on meeting high performance standards.

Several steps can be taken to support and drive research activity and applications for foreign grants:

- Use commonly accepted international research and development performance indicators
- Establish a Research Support Office. This office could create a research data base and support staff in compiling first class research proposals
- Provide adequate seed and reward money from the University budget to support promising research initiatives and outstanding achievements
- Join with other university research initiatives for larger EU grants

Most of the academic staff at BUT have been educated in the university and on completion of their studies have moved immediately into their research and teaching posts here. We feel that research and education in the university may be adversely affected by this. While the hiring of its own graduates is probably unavoidable it is the opinion of the Team that all staff should gain new perspectives by spending time in a foreign university. Once again we recommend that BUT establish an effective sabbatical system to allow staff to spend time abroad. In many countries colleagues facilitate this process by taking over the teaching duties of the person going abroad. This system works well when courses have been properly modularised.

The SER notes that heavy teaching duties leave little time for research. Given the reasonable student:staff ratio it seems that this may be due to over-teaching and to the large number of entirely separated study programmes with resulting duplication of courses. It is obviously important to get a proper balance between research and teaching, but of course this issue is not unique to BUT. The change to modular courses as well as a move to a more learning, as opposed to a teaching, environment will certainly contribute to achieving the needed balance.

The PhD programme at BUT is well organised and staff expressed satisfaction with the funding available from the state. In the context of international competition for research funding we suggest that the university should seek to strengthen international acceptance of its PhD graduates. The following measures might assist in achieving this goal:

- Joint PhD programmes supported by the EU
- Use of external referees
- Publication of results, especially of PhD research achievements, in international refereed journals,
- Systematically stimulated and rewarded attendance at international conferences.

Protection of intellectual property has assumed major importance in recent years. It is crucial that the university bears this in mind as it expands its research effort.

4.3 Internationalization, Bologna Process

In the Bologna Process three action items have been emphasised for the creation of the European Higher Education Area (EHEA). Quality assurance is the first of these and we have discussed the creation of a robust QA system in BUT earlier in this report. The second is the adoption of a degree structure on two main cycles. The university is to be congratulated on having this system already in place. The third is the mobility of students and teachers.

In this regard the Ministers state that 'mobility of students and academic and administrative staff is the basis for establishing a European Higher Education Area. Ministers emphasise its importance for academic and cultural as well as political, social and economic spheres, and agree to undertake the necessary steps to improve the quality and coverage of statistical data on student mobility'. In particular they stress the important role played by the European Credit Transfer System (ECTS) in facilitating student mobility and they appeal to institutions and employers to make full use of the Diploma Supplement. Again BUT is well advanced in the use of ECTS.

From the information provided by the SER and from our meetings with staff and students the Team feels that much has to be done to improve on the international mobility of staff and students. Under Socrates/Erasmus programmes in academic year 2002/2003, 94 teachers spent a total of 132 weeks abroad, 156 students spent a total of 993 months abroad, while only 44 students came to BUT from abroad (excluding Slovakia). Czech students receive only Euro 350 under the programme with the possibility of a scholarship supplement from the university.

The SER points to several factors to explain the small number of students from abroad: the absence of a university-wide marketing strategy, the narrow range of study programmes in English, the need to approach international students individually, the impossibility of studying at different faculties at the same time, the focus of financial strategies of a number of faculties into other areas, the limited number of academic staff capable of teaching in English. In addition there is the issue of the visibility and image of BUT on the international scene. A related problem arises from the Czech Higher Education Act: Czech students are not allowed to attend study programmes provided to international students in English for free.

The Office for External Affairs plays a fundamental role as BUT is developing its many contacts in Europe and in the world. The services rendered to the community by this office are numerous and include: efficient advice to BUT students and foreign students, information on the European mobility programmes, help in developing networking with more foreign universities. It appears that shortage of staff inhibits the Office from extending its programme.

However the reality of international actions is not visible enough, and above all there is no clear university policy for internationalisation. The difficulties and obstacles to expansion of the mobility of staff and students stem from the fact that there appears to be no central plan to bring the academic community together to develop a coherent strategic plan for internationalisation. This plan could also include the achievement of objectives in the area of international research contacts and scientific collaboration.

Considering the good work done by the Office of External Affairs and the experience acquired, the review team would wish to recommend a number of steps in order to give international relations the place they must occupy in the European and world context:

- Include in the university strategic plan an international university policy for the next five years with all university components (faculties, departments, research centres) based on the work already done, on effective contacts, on scientific priorities, on geographic areas, etc.
- Allocate a fund to the Office of External Affairs to promote existing/new actions. Confirm the central role played by this Office in implementing the university international policy in cooperation with all university components
- Develop a systematic policy of information to the university community (on European programs, networks, scholarships, ECTS, 6th Framework, Bologna process, Erasmus mundus, etc)
- Define targets to be reached concerning the increase of the mobility of students and teachers and also administrative staff; create more motivation utilising the experience of former Erasmus and Leonardo students; make sure that all PhD students spend a study period abroad; develop a sabbatical programme for BUT teachers with foreign universities and systematic exchanges
- Establish a central Foreign Languages Department
- Provide English language training for staff and students
- In support of the University's goal of providing all study programmes in the English language set a short term target of providing 10% of the programmes in English
- Collect centrally all data at all levels on international actions in order to follow their evolution, their results. Use this monitoring (this log-book) to have a clear view of BUT's presence in Europe and in the world.

Envoi

We wish to thank the University once again for its generous hospitality and for the excellent arrangements provided for the Review Team. It was a pleasure to be in Brno to discuss with students and staff the future directions of the Brno University of Technology. At this time of profound and far-reaching change in higher education the University is to be congratulated for its frank and open examination of its ability to meet the challenges and opportunities that lie ahead. In all our meetings we were struck by the strong determination to see the University achieve its full potential as an institution of high international standing. We hope that the University finds our comments and suggestions helpful, and we wish the University well for the next stage of its development.