

## QUALITY MANAGEMENT SYSTEM AS THE BASIS OF QUALITY ASSURANCE AT VSB-TECHNICAL UNIVERSITY OF OSTRAVA

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**Abstract:** VŠB – Technical University of Ostrava (VŠB-TUO) is the first and heretofore only public university in Czech Republic that has ISO 9001 certification. The Faculty of Mechanical Engineering was the one Faculty of VSB-TUO awarded the Czech Republic National Quality Award 2007 in the public sector category. The contribution describes the path of VSB-TUO in implementation of a quality management system to implementation of EFQM Excellence Model as step beyond ISO 9001 certification. (JEL: P11, O43, L15)

**Key words:** Quality Management System, Self-assessment, EFQM Excellence Model, National Quality Award.

### Introduction

Currently universities exist in a *competitive environment*, a principal reason why they must consider themselves organisations providing the services that satisfy their customers.

They provide:

- university-level education,
- R&D
- cooperation with business and public sector

The quality of the services provided is the result of the quality of processes that are used to secure them. Quality of processes is determined by the quality of the management of the university. If we want to improve the quality of services provided by the university, it follows that we must start with improving the quality of university management. To lead and operate an organization successfully, it is necessary to manage it in a systematic and visible manner. This was the reason that VŠB-TUO decided to implement QMS as inherent part of university management.

### VŠB–Technical University of Ostrava

The 160 year history of VŠB-TUO is closely connected with the development of mining and metal extraction, which was the oldest industry in the Austro-Hungarian Empire. That is why the Emperor Frantz Josef I. decreed (1849) that a mining vocational school be set up in Příbram for the northern countries, and another in Leoben for the southern countries of the Empire. In 1904, the Příbram Academy was given the status of University –

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Vysoká škola báňská (VŠB). The President of the Czechoslovakia, E. Beneš, issued a decree No. 49 on the 8<sup>th</sup> of September 1945 by which the university was moved from Příbram to Ostrava. This ended the history of the Příbram campus and opened a new era in the history of the University in Ostrava, the centre of a widespread chemical, heavy engineering and mining industries region.

The 17<sup>th</sup> November 1989 was a historic event in the life of Czech universities and in the whole society. Significant changes have been made at VŠB-TUO. The reorganisation of all courses and the new provision of modern branches of study transferred VŠB-TUO to a modern polytechnic university.

VŠB-TUO currently consists of seven faculties:

- Faculty of Mining and Geology (since 1849)
- Faculty of Metallurgy and Material Engineering (since 1849)
- Faculty of Mechanical Engineering Faculty (since 1951)
- Faculty of Economics (since 1977)
- Faculty of Electrical Engineering and Computer Science (since 1991)
- Faculty of Civil Engineering (since 1997)
- Faculty of Safety Engineering (since 2002).

There are more than 23 000 students in bachelor degree, master degree and doctoral degree programmes in traditional, distance and combined studies; approximately 2000 staff (1000 of whom are teachers and R&D personnel). VŠB-TUO is the third largest university in Czech Republic.

#### **Implementation of Quality management system at VŠB-Technical University of Ostrava.**

Currently there are two basic concepts of QMS:

- the concept of ISO 9000
- the concept of TQM.

The concept of ISO 9000 is the holistic prescriptive approach based on International standards ISO 9000 series. These standards define what is necessary to do (ISO 9001) and how to do the things (ISO 9004).

The concept of TQM is a non prescriptive approach, more or less a philosophy. TQM is applied according to different models that enable evaluation of the maturity of the management system in the organisation. EFQM Model Excellence is used in Europe.

The existence of explicit defined guidance, which has been successfully verified many times in the industry, led to the decision to implement QMS according to the ISO 9000 concept at VŠB-TUO. There are no significant reasons why the benefits of implementation of QMS in industry would differ in the case of the university. The decision to implement QMS according to ISO 9001 was supported by the existence of ISO 9001 registration. The ISO 9001 certificate is evidence to the fact that the university is being properly managed, the needs of their customers are identified, and the environment to satisfy them is established.

To utilize the good practices from industry, the management of VŠB-TUO has employed a quality manager that had the long-term experience with QMS implementation and maintenance at a first class manufacturing company that was awarded by the Czech Republic National Quality Award 2001.

VSB-TUO is a huge institution with a wide variety of activities. The simultaneous implementation of QMS in the whole organisation carries risk. The experiences from the implementation of QMS in industry are not fully transmitted into the university environment. There are at least two important differences:

- the cycle time of product realisation is significantly longer than in industry,
- the academic freedom of members of university staff.

These were the reasons why we split the implementation of QMS into several stages. As each faculty is a relatively autonomous part of the university, the first stage (2004) was the implementation of QMS at a selected faculty as a pilot project. The experiences from the pilot project were used during the second stage (2005-2006) of QMS implementation at the subsequent faculties utilising experiences from the first stage. The final, third stage (2007) was the implementation of QMS at the administrative and executive branch of the University.

Based on the successful certification audit in July 2007 *VŠB-TUO was the first public university in Czech Republic awarded by ISO 9001 certificate.* Each stage consisted of two phases:

- Preparation phase
- Implementation phase

The preparation phase included 5 steps:

1. Decision of faculty/university management about implementation of QMS
2. Declaration of mission , vision and strategy (quality policy)
3. Definition of project team for implementation of QMS
4. Definition of terms
5. Allocation of resources (financial, HR, ...)

The declarations of vision, mission and quality policy was a fundamental step. They were formulated by faculty/university management and communicated throughout. To attain the commitment of staff, the informational and discussion meetings took place. The commitment to quality policy was the base for definition of quality goals on the Faculty or University level. The quality goals were subsequently disseminated to the departmental level and linked with personnel goals.

The implementation phase consisted of 7 steps:

1. Training the staff on QMS
2. Implementation of “process” approach, consisting of :
  - a. *Identification of processes and definition of the process map*
  - b. *Definition and documentation of processes*

- c. *Definition of process performance criteria*
3. Comparison of existing status with ISO 9001 requirements
4. Implementation heretofore missing procedures (control of documents and records, internal audits, correctives action, preventive actions)
5. Assessments of process performance and quality system review
6. Implementation of actions to improve system performance
7. Certification of QMS.

Processes at the faculty level were divided into three basic groups:

- Customer related processes (education – bachelor, master and doctoral level, R&D activities, and cooperation with business and public sector)
- Managing processes (strategy management of faculty, operational management of faculty)
- Supporting processes (support of education process, support of R&D, purchasing, control of information systems.)

There are different *processes at the university level*. The faculties are looked as the internal customers of university. It means the university supports the faculties. The main, customer orientated processes from the point of view of university, are processes of resource management:

- finance management
- facility management
- HR management
- IT management

These resource management processes are executed and controlled by force of strategic management and operational management processes at the university level.

### **Monitoring and Measurement in the Management System according to ISO 9001**

The concept of ISO 9000 family standards are based on eight quality management principles:

1. Customer focus
2. Leadership
3. Involvement of people
4. Process approach
5. System approach to management
6. Continual improvement
7. Factual approach to decision making
8. Mutually beneficial supplier relationship

At least two of the eight fundamental principles of ISO 9000 family standards, “Factual approach to decision making” and “Continual improvement”, require the existence of data. The way to attain the data is to implement monitoring

and measurement. Any system we want to control has to be monitored and measured.

There are two types of measurements and monitoring defined by ISO 9001[1]:

- *Measurement and monitoring of product* (provide the data to verify that product requirements are met) – 8.2.4 of ISO 9001
- *Systemic measurement and monitoring* (provide the data and information regarding QMS performance). Basic obligatory requirements of ISO 9001 are:
  - Measurement and monitoring of customer satisfaction 8.2.1
  - Monitoring and measurement of processes – 8.2.3
  - Internal audit – 8.2.2

### **Implementation of monitoring and measurement at the university**

Measurement and monitoring of university education is realized by means of the exams that students must pass after finishing study of each subject. The final state exam (part of this is the defence of diploma thesis) is recognized as an outgoing inspection of the university study program. The exams after finishing individual subjects and the final state exam verify if the level of education which a student obtains is in compliance with the requirement 1. of the university education. At the same time they act as feedback for teachers and university management and are used for control of the education process at the university.

The basic systemic measurements in the university environment are:

- students' satisfaction during their study at university
- graduates satisfaction after some period following completion of university study
- employers' satisfaction with graduates from university
- measurement of process performance
- internal audits

Evaluation of students' satisfaction during their study at university is usually arranged by anonymous questionnaires both in paper and electronic form at the end of each semester. Students evaluate the condition of study and approach of teachers. The students are not able to evaluate the content and usefulness of study program for their future job during their studies.

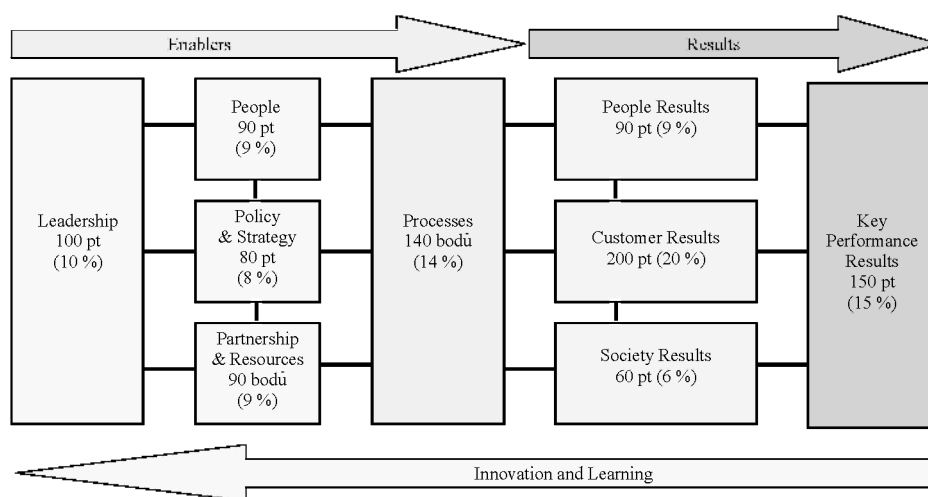
Graduates' satisfaction after some period following completion of university study provides feedback about the level and usefulness of their study program. The university could receive the same type of information from employers. The methods used for evaluation of the graduate and employer satisfaction are questionnaires and interviews. Special conferences mapping the job market provide good possibilities to obtain the data regarding satisfaction of graduates and employers. The example of such a conference in Czech Republic is KARIERA+, which is regularly organized by VŠB-TU Ostrava on yearly basis.

The process performance criteria (metrics) are used for evaluation of process performance. The definition of process performance criteria that properly characterizes the processes at the university is not easy, some say impossible. But we must answer the question: “Do we want to control the processes in the university?” If yes, it is necessary to define the process performance criteria, because if we do not measure the processes we are not able to control them.

Internal audit is the next important systemic measurement that provides independent information about conformance and performance of the management system. The client of the internal audit is university management.

These basic systemic measurements are followed up by evaluation of suppliers of the university, evaluation of effectiveness of training of personnel of the university and, of course, financial measurement.

The complex instrument for evaluation of the maturity of the management system of the university is assessment based on the EFQM Excellence Model [2], see figure 2. This model was also rearranged for education institutions [3], [4].



**Figure 2. EFQM Excellence Model**

Source: [2]

### Implementation of self assessment according to EFQM Model Excellence at VŠB-TUO

Significant motivation for orientation VŠB-TUO to the complex quality comprehension was the Program of the Czech Republic National Quality Award, which was in year 2006 opened for non-profit organizations and extended by two categories – based on the CAF Model and based on the EFQM Model Excellence. The Faculty of Mechanical Engineering was the pilot faculty where we started implementation of TQM philosophy. This faculty applied to the Program

of the Czech Republic National Quality Award 2006 - part assessment based on EFQM Model Excellence.

Many analyses were done during the self-assessment process. The most significant weaknesses and threads were selected, analysed and activities towards their removal was quickly run. Many uncertainties were eliminated by new analyses by questionnaires for graduates, new students and unsuccessful students. The next important area which was omitted in the past was collaboration with suppliers; particularly collaboration with the high schools. The project called "Partnership with High Schools" was started at the end of year 2006 by the concrete offers for study support, such as special excursions to the faculty labs, university teacher lectures focused on actual technical problems and current events, and other real collaboration support.

Based on evaluation of the self-assessment report, followed by site visit of assessors, the Faculty of Mechanical Engineering was awarded by - "Recognised for Excellence-2006" level. The feedback from the site visit was considered very useful. Other possibilities for improvement were identified.

The next step was the dissemination of TQM approach at next faculties. Some of them applied and took a part in the Program of the Czech Republic National Quality Award. The survey of achievements can be seen in table 1.

**Table1. The achievements of VSB-TUO in the Program of the Czech Republic National Quality Award.**

Year	Faculty of VSB-TUO	Level of award
2006	Faculty of Mechanical Engineering	Recognised for Excellence
2007	Faculty of Mechanical Engineering	Award winner
	Faculty of Mining and Geology	Recognised for Excellence
2008	Faculty of Mining and Geology	Price winner
	Faculty of Metallurgy and Material Engineering	Recognised for Excellence

Faculty of Mechanical Engineering of VSB-TUO became „Czech Republic National Quality Award Winner 2007 – category public sector”. It was the first time the University was given this prestigious award.

### Summary

The implemented QMS brings the benefits both to customers and stakeholders of the university (students, employers, society), and to university itself. The results of the implemented TQM approach at the VSB-TUO and participation in the Program of the Czech Republic National Quality Award are very positive. The orientation to the complex quality improved the university life, its processes and efficiency.

## References

- [1] ISO 9001:2000 Quality management systems - Requirements
- [2] EFQM Excellence Model, EFQM Brussels Representative Office, Belgium ISBN 90-5236-242-4. Internet: <http://www.efqm.org/>
- [3] The EFQM Excellence Model- Higher Education Version 2003, Centre for Integral Excellence Sheffield Hallam University, 2003.
- [4] TRIS-EFQM model version 4.2, - Method for Quality Improvement of Higher Education, TRIS edition, KHKempen, Kleinhoefstraat 4, B2440 Geel, Belgium ISBN 9080779725

### SYSTEM ZARZĄDZANIA JAKOŚCIĄ JAKO PODSTAWA ZAPEWNIENIA JAKOŚCI W POLITECHNICE W OSTRAWIE

**Streszczenie:** Politechnika w Ostrawie (VŠB-TUO) jest pierwszą i dotychczas jedyną publiczną uczelnią wyższą w Czechach, która posiada certyfikat ISO 9001. W roku 2007 Wydziałowi Inżynierii Mechanicznej przyznano czeską nagrodę jakości (*the Czech Republic National Quality Award*) w kategorii sektora publiczengo. Artykuł przedstawia ścieżkę wdrażania systemu zarządzania jakością przez VŠB-TUO aż do implementacji Modelu Doskonałości (*EFQM Excellence Model*), co było krokiem niezbędnym do uzyskania certyfikatu ISO 9001.