Knowledge, Research & Education at University and in Industry

Knowledge, Research & Education at University and in Industry

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CTU in Prague, Faculty of Electrical Engineering, Microelectronics Department

Power and productivity
for a better world™

Outline

- Introduction

- Knowledge

- Research

- Education

- Summary

Disclaimer: The objective of this presentation is not to evaluate the organizations under discussion, but rather to inspire by their best practices…

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How CTU in Prague is organized
Eight faculties

CTU in Prague

23,500 students

4,000 employees

13,400 BSc.

5,200 MSc.

2,300 PhD.

The Times Higher Education Supplement Ranking

2009: 394. CTU in Prague

Civil Engineering	**Mechanical Engineering**	**Electrical Engineering**	**Nuclear Sc. Phys. Engng.**
6,600 students 450 teachers	2,900 students 270 teachers	6,000 students 400 teachers	1,700 students 100 teachers

Architecture	**Transportation**	**Biomedical Engineering**	**Information Technology**
1,000 students 100 teachers	1,900 students 140 teachers	750 students 60 teachers	500 students 180 teachers

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How ABB is organized
Five global divisions

ABB Inc.

$35 billion
118,000
employees in

100 countries

Power Products	Power Systems	Automation Products	Process Automation	Robotics
$11.3 billion **34,000** **employees**	**$6.6 billion** **16,000** **employees**	**$9.0 billion** **36,000** **employees**	**$7.3 billion** **27,000** **employees**	**$1.0 billion** **5,000** **employees**

2009 revenues (US$) and employees per division

CNNMoney.com News | Markets | Te

FORTUNE

Home   Fortune 500   Brainstorm Tech   Inve

GLOBAL 500   *Our annual ranking of the*

| Full List | By Location | CEOs |

230. ABB

Rank: 230 (Previous rank: 256)
CEO: Joseph M. Hogan
Employees: 119,600
Address: Affolternstrasse 44
Zurich, 8050
Country: Switzerland
Website: www.abb.com
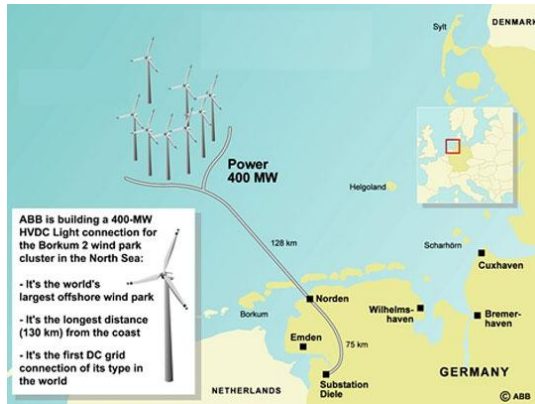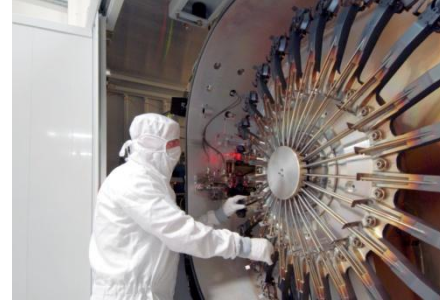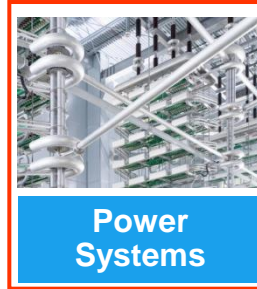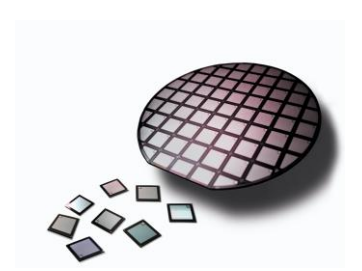
- ABB's portfolio covers:

- Electricals, automation, controls and instrumentation for power generation and industrial processes

- Power transmission

- Distribution solutions

- Low-voltage products

- Robots and robot systems

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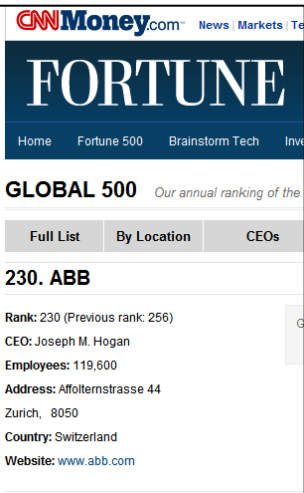
Power Systems

Power
Systems
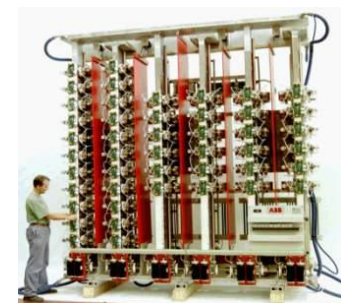
Francis Bacon (1561-1626)

„Knowledge is Power"

Knowledge

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Knowledge

Francis Bacon (1561-1626)

„Knowledge is Power"

Discipline based Research[*] ⟷ **Research in a context of application**[*]

Academic, investigator-initiated, discipline based production of knowledge, homogeneous, hierarchical,
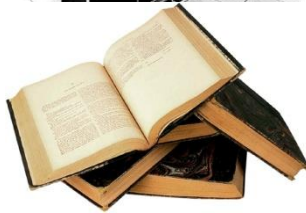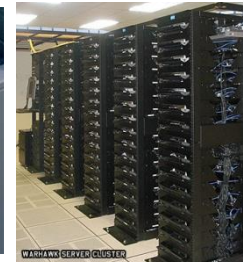
Context-driven, problem-focused, interdisciplinary based production of knowledge, heterogeneous, temporary, specific, localized…

[*]1994 Gibbons et al, The new production of knowledge

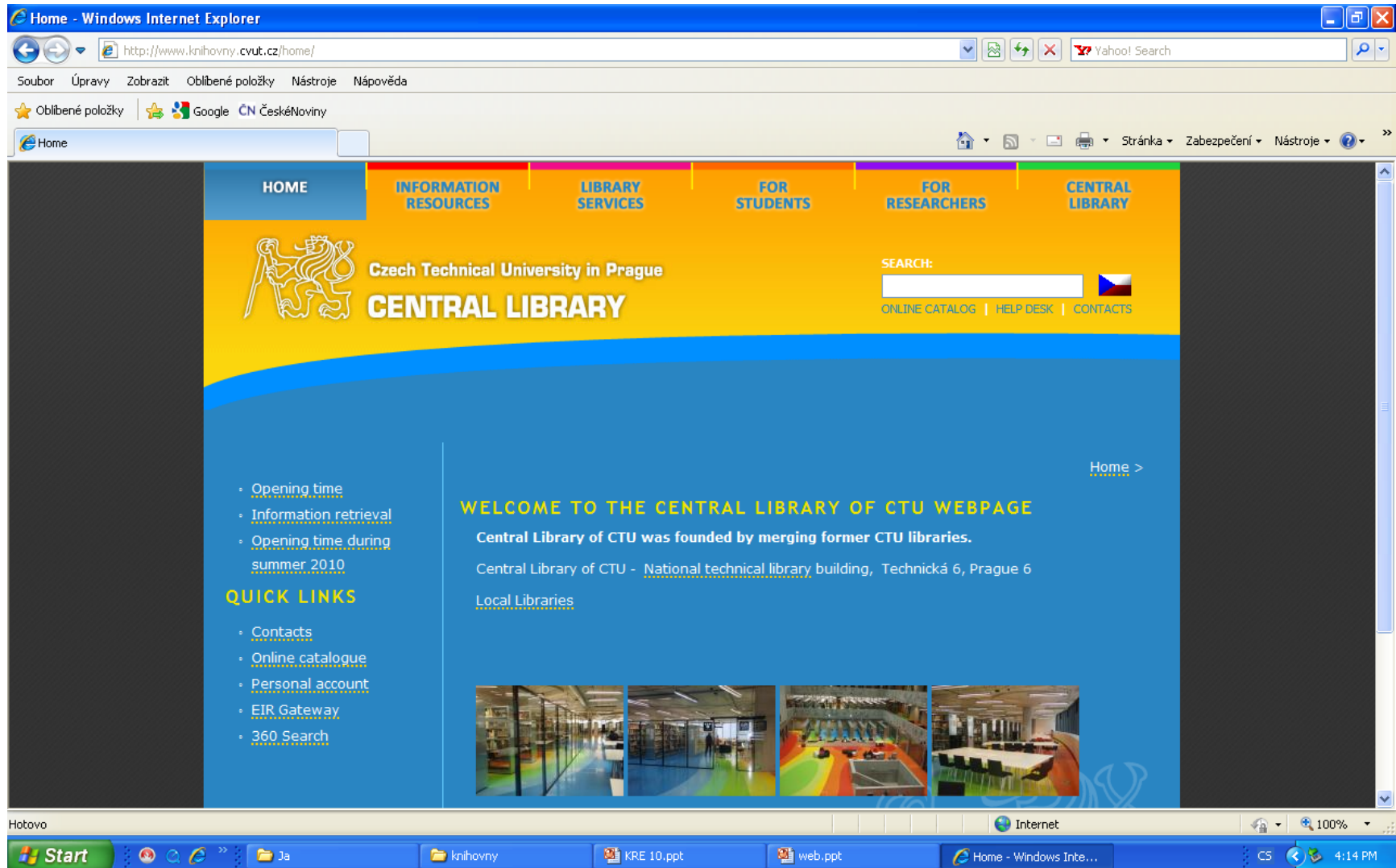# External Sources of Knowledge (Information)

1970   1980   1990   2000   2010   2020

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External Sources of Knowledge at CTU in Prague

External Sources of Knowledge at CTU in Prague

CTU Central Library vs. other Universities

Knowledge Management Control

- **Groupware** (e. g. Lotus Notes)

- **Intranet**

- **Document Management System**

- **Content Management System**

- **Web Engines**

- **Push Technology** (e.g. IP Agent)

- **Helpdesk Systems**

- **Workflow Technologies**

- **Data Warehouse**

- **Data Mining Tools**

- **Expert Systems**

- **Distance Learning**

- **e-Learning Systems**

- **Companies with best-performing IT investments are often most frugal IT spenders**

- **SW and SW-oriented services too costly for industry →**

  - → **Universities provide more advanced services**

  - → **Universities profit from multi-user approach of services**

  - → **Industry puts money mainly to core functions and businesses**

  - → **Industry is mostly customer & competition driven**

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Knowledge Management (example)

ABB's Process Automation:

Expert Optimizer, Knowledge Manager and SpectraFlow solutions combined into a single Collaborative Production Management operational unit.

Expert Optimizer

- Raw Mix Preparation

- Economic Process Optimization

Knowledge Manager

- Laboratory Information Management Systems module

- Production Information Management Solution modul

ABB's Automation Division Service organization:

A global Knowledge Management System APSwebs to help with best-in-class practices and field experiences to better execute site service contracts

… is all about networking and sharing knowledge and best practices within ABB's service organization worldwide…

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Protection of Knowledge (IP)

United States Patent [19]
Galster et al.

US006159830A

[11] Patent Number: 6,159,830
[45] Date of Patent: Dec. 12, 2000

Situation at CTU

- Money from IP wanted

- Increase reputation through IP

……rather than ….

- support start-up´s of spin-off companies

- strengthen cooperation with industry - bridge the gap between academia and industry

- master the technology transfer

Strategy of ABB

- Safeguard and enhance technological leadership in the market

- Protect proprietary technology of own products and systems

- Protect brand, identity and reputation

- Defend own IP rights against misappropriation and un-authorised use by others

- Avoid conflicts with third party's rights

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Protection of Knowledge (IP)

Implementation in ABB

- Group wide process and structure to ensure

  IP rights generation, ownership, maintenance and exploitation

  Alignment with business & technology strategies

  Proper awareness and capabilities throughout the organization

- Global Management designed to achieve

  Involvement of all functions concerned

  Harmonized and effective decisions (Review Process)

  Flexible adaptation to changing strategies and regulations

- Strategic orientation to :

  Core technologies, products and markets

  Quality rather than quantity

  Value creation through long term company assets

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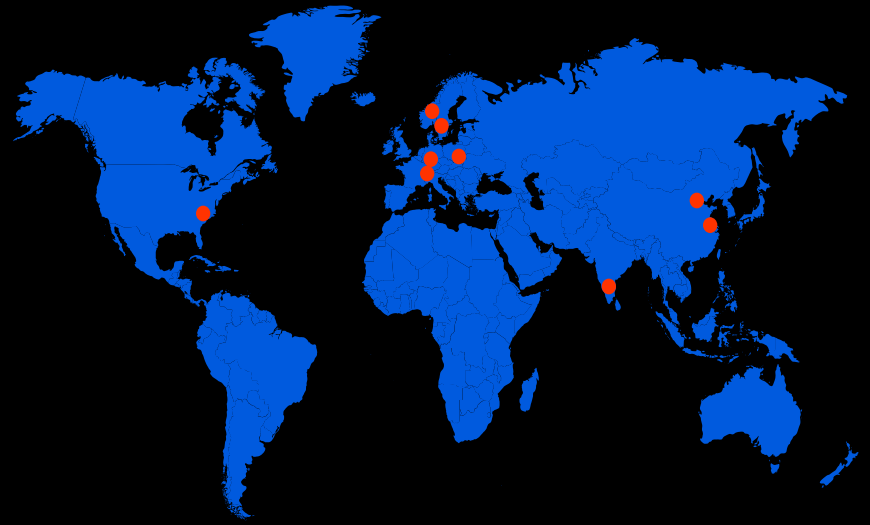
Research

Research

CTU in Prague   **ABB**

- Research at Departments   ⟷   - Factory Research

- Research at Institutions   ⟷   - Corporate Research Institutions

- To strengthen reputation and   ⟷   - To strengthen market position
attractiveness for students

- Maintain leadership between   ⟷   - Ensure technology leadership
technical universities within CR

- To improve worldwide ranking   - To increase profitability

- Annual investment highly   Annual investment more than $1billion
dispersed (Government, Grant Agencies,   (from own revenues)
Industry,…)

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Research

CTU in Prague

- Research Institutions

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- Corporate Research Institutions

Västeras (SE)
Oslo (NO)
Ladenburg (DE)
Krakau (PL)
Baden (CH)

Raleigh

Beijing

Shanghai

Bangalore
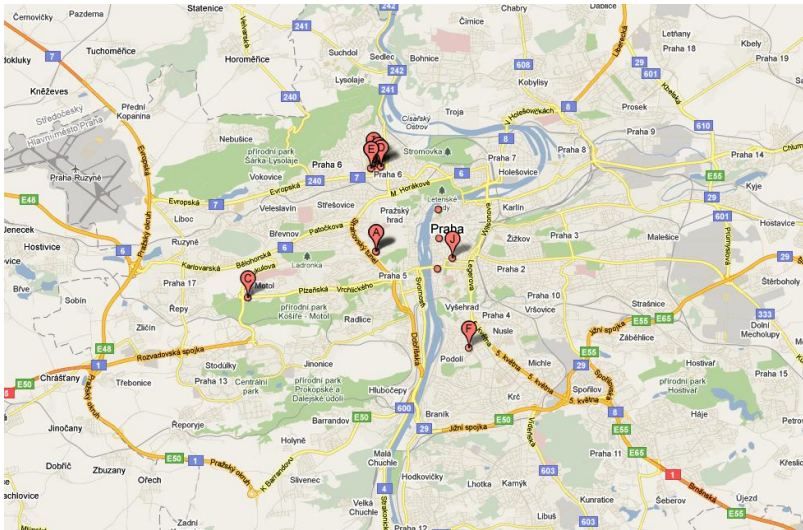
Research Institutions spread everywhere → remote information services needed…

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Research & Access to Information

University

- Public sources - journals, books, patents,…

- Cooperation with research institutions and industry

- ………………………..

- ………………………..

- Strongly dependent on public sources (= mostly history)

Industry

- Public sources - journals, books, patents,…

- Cooperation with research institutions and universities

- Technology offers from suppliers

- Cooperation with competitors

- More dependent on forecasting (= often wrong) and road mapping

Cooperation of Industry with Universities
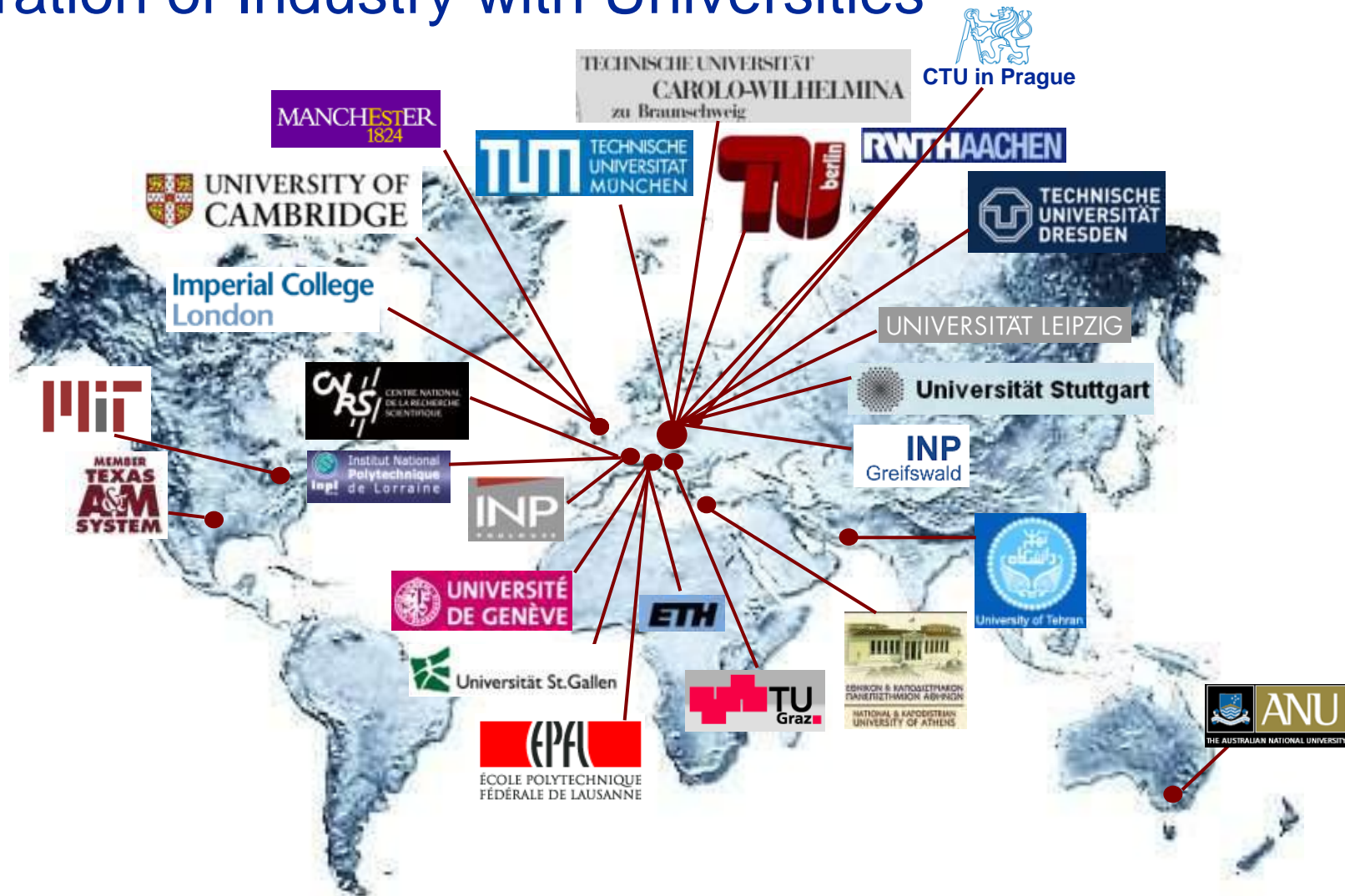
Industry cooperates with highly ranked institutions, developers of relevant IPs, top experts / specialists. Core business covered by industry. IP kept by industry. Reasons for cooperation?

→ Access to information, future trends, modern technologies, … Access of talented graduates to industry.

R&D in Industry: Context and Expectations

Customer / Suppliers / Competitors / Government / Regulations / Other Stakeholders

ABB Business Strategy

Research → Patent, prototype, pilot → Division / BU Product Development → Product, service, system

- Explore future technologies and trends, with high risk of failure
- Results: not clearly defined at outset, often intangible
- Often broad relevance to ABB (often cross-BU/division)

- Mostly predictable, aim to limit and control risks
- Results: typically well-defined, includes significant share of product maintenance
- Mostly specific relevance to Business Unit

„Research as part of the Business Strategy"
"Right balance between short-term vs. long-term orientation"

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Measuring and Reviewing R&D in Industry

Strategic metrics
'Do right things'

Future-oriented,
long lead time,
partly subjective

R&D

Business Strategy, Cust. needs, Regulations → Technology Strategy / Resource-Input → Technology Activities → Technology Results → Business Results

Operational metrics
'Do things right'

Past-/actual-oriented,
near- or short-term,
fairly objective

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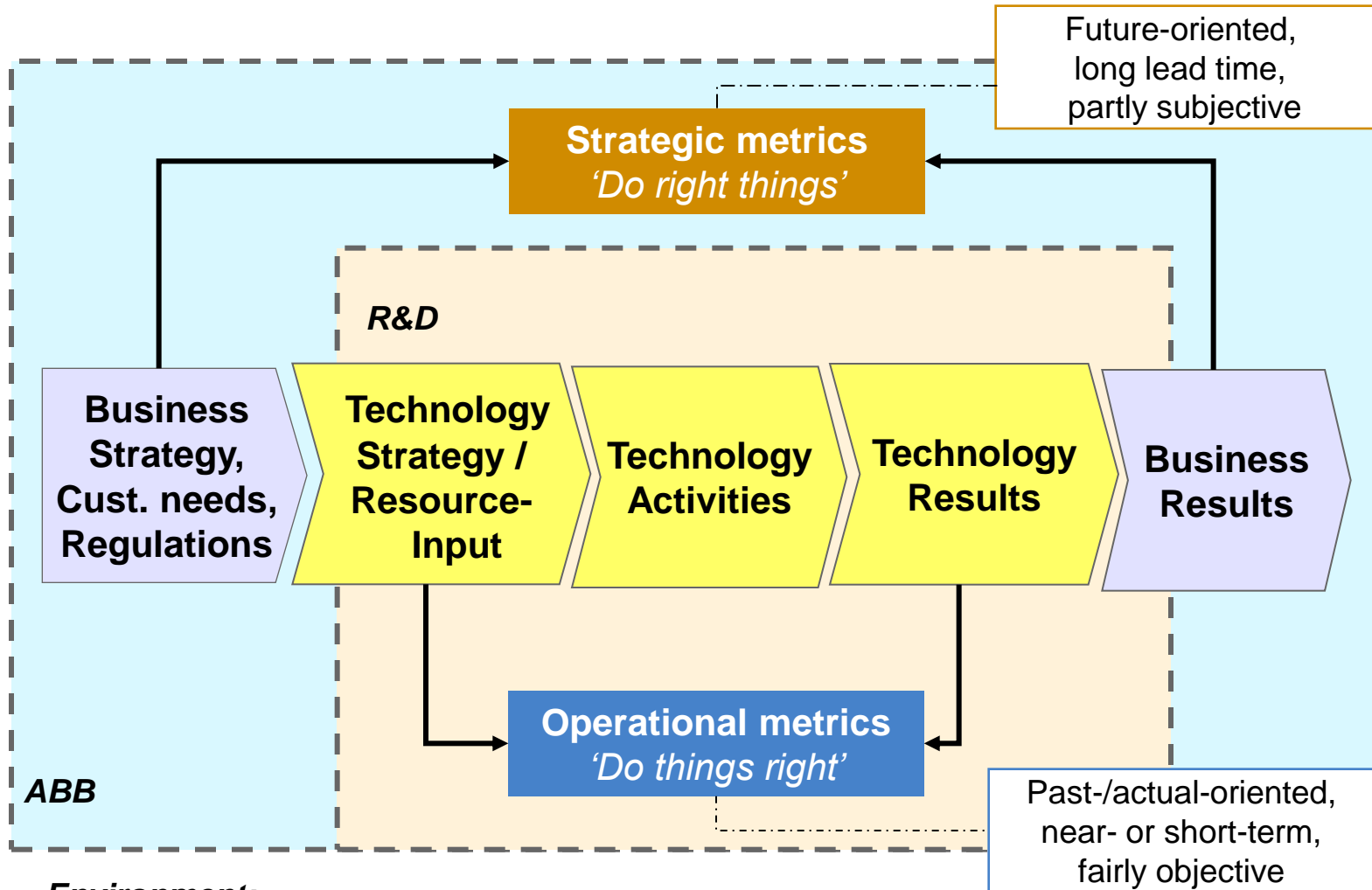
Environment:
Customers, Competitors, Governments, Suppliers, other Stakeholders

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Research

- is a global activity (spread worldwide),

- needs well defined strategy,

- needs efficient strategic and operational metrics,

- needs efficient planning,

- bridging the gap between Univeristy and Industry is a never ending task …

Growing role of

→ on-line and remote information services and infrastructures,

   i. e. the Digital part of Library,

→ bibliometric tools

→ close cooperation between Library and IT Specialists,

→ close cooperation between Library and Researchers,…

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Want to know more about e-learning?

Join the online forum and connect with e-learning developers

The forum is open to all ABB employees and designed to connect e-learning developers of all skill levels. Whether you are new to e-learning or have lots of experience, the forum will help you find answers and support from other e-learning developers across the ABB organization.

Launched by ABB University, the forum is open to e-learning developers from all ABB organizations. A moderator group of very experienced developers manages the forum structure and will keep the content current.

To join the e-learning forum, click here.

e-learning forum

Education

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CZECH TECHNICAL UNIVERSITY IN PRAGUE

Home Page → For Incomers

FOR INCOMERS | **CURRENT STUDENTS** | **MEDIA, SPECIALISTS AND THE PUBLIC**

Academic Calendar 2009/2010

News RSS

- Survival guide
- Erasmus and Exchange
- CTU Scholarships
- Erasmus Intensive Language Course (EILC)
- ATHENS
- Programmes in English
- PhD Programme in English

CZECH TECHNICAL UNIVERSITY IN PRAGUE

Home Page → Faculties

FOR INCOMERS | **CURRENT STUDENTS** | **MEDIA, SPECIALISTS AND PUBLIC**

- Academic Bodies
- Faculties
  - Faculty of Civil Engineering
  - Faculty of Mechanical Engineering
  - Faculty of Electrical Engineering
  - Faculty of Nuclear

Faculties

- Faculty of Civil Engineering
- Faculty of Mechanical Engineering
- Faculty of Electrical Engineering
- Faculty of Nuclear Sciences and Physical Engineering
- Faculty of Architecture
- Faculty of Transportation Sciences
- Faculty of Biomedical Engineering
- Faculty of Information Technology

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inside/group

ABB Group Business guide Countries   Friday April 9, 2010

News Our profile Organization Customer focus **Tools & services** Working with ABB

Training & eLearning

ABB University Homepage

Student Login

TP Online Admin Login

Learning Paths

Virtual Classroom & Communications Center [+]

abb.com/abbuniversity

News update

Record number of web visitors for ABB University

Almost 35,000 web visitors in 2009

Over the last few years, ABB University has invested significantly in its Learning Management System (LMS) and promoted its training web pages to employees and customers alike. LMS is the global application that helps the ABB Learning Centers to easily manage processes needed for delivering training online.

As a result of these efforts, the ABB University's course locator recorded almost 35,000 visitors in 2009, where web visitors can choose from over 900 courses.

Welcome to ABB University!

ABB University overview presentation
Learn about our organization, objectives and administration.

ABB University Team Room
Everything you need to know about ABB University.

High5 moved to TP Online
Click here to learn more.

Course locator

Technology & solutions
ABB product related courses for project planning, operating, and maintenance personnel.

Business processes & tools
Training courses relating to the business processes of development, manufacture, sell and deliver projects and products.

Personal competencies & skills
Personal development of social competences including languages and cultures.

Management & leadership
Comprehensive management development curriculum for developing the leadership competence of junior managers.

Comments (16)

Notify me of comments posted on this page

High5 Users - Please read
gudrun.jackson@us.abb.com   Montag, 29. März 2010 20:11

Search [OK]

@ E-mail this page [+]

Rating
Rate this page:
Average rating:
Ratings: 41

Contact us
Local country contacts
Please select country [OK]

Page information:
→ Gudrun Jackson
   Web Communications
   ABB University

Newsletters
→ ABB University LMS Newsletter - December 2009

→ ARCHIVE | Web feed

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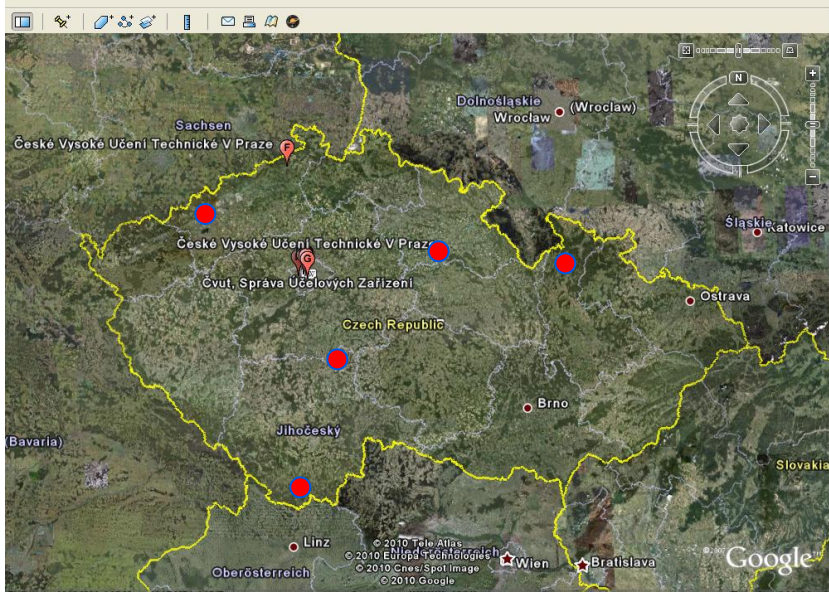
Education

CTU in Prague

- Covers multiple technical fields

- Operates within the Czech Republic

ABB University

- Covers technology, management & business oriented fields

- Operates at many corners of the globe

Education

CTU in Prague

- A classical teaching organization built from 8 faculties

- Comprising approximately 15 learning centers in single country
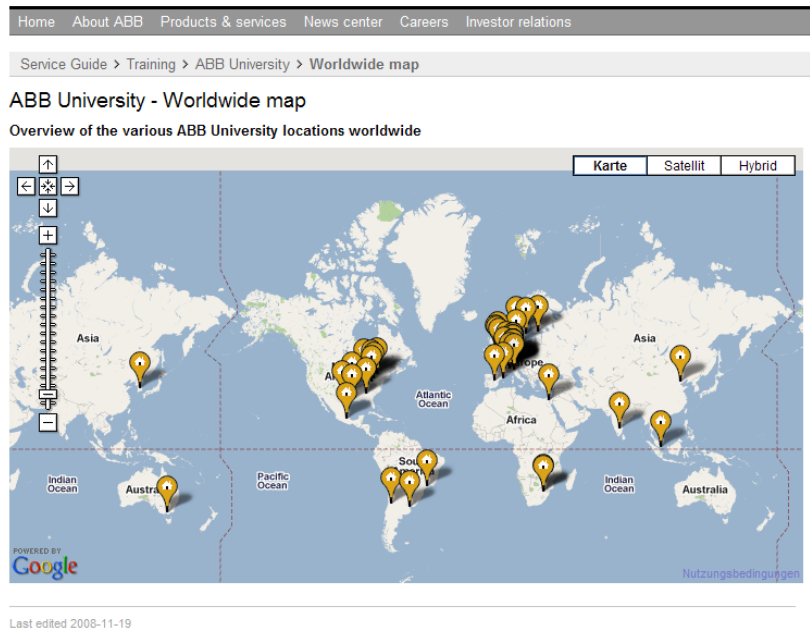
ABB University

- A virtual organization built from all ABB divisions

- Comprising approximately 120 learning centers in over 30 countries

Education

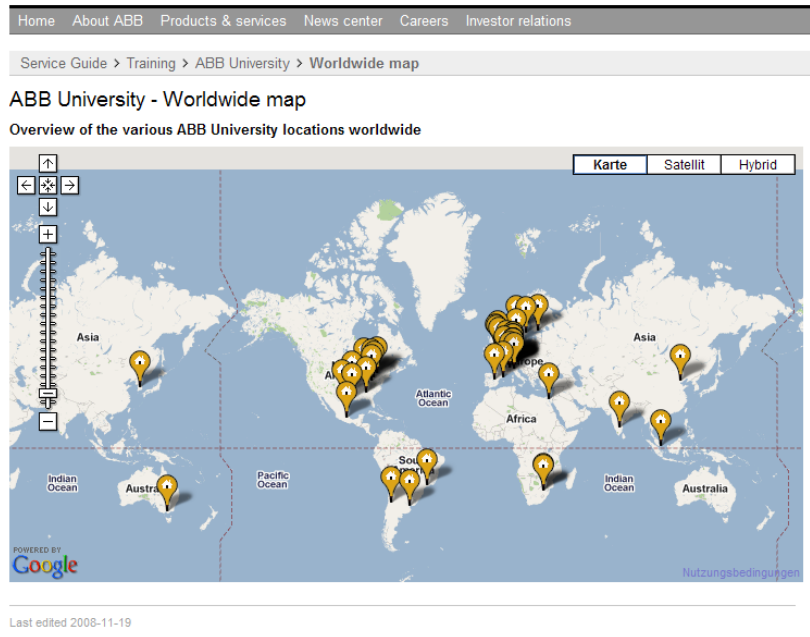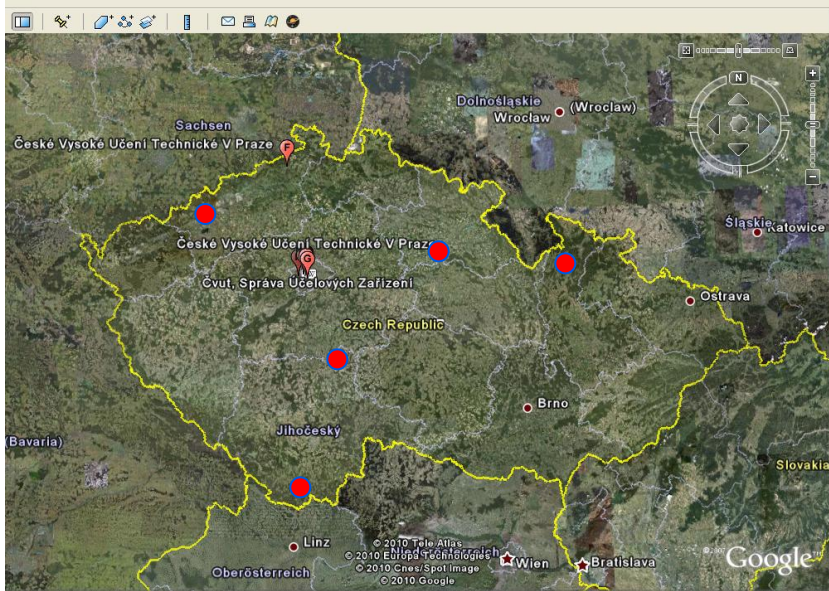**Lecture-based   vs.   Competence-based learning**
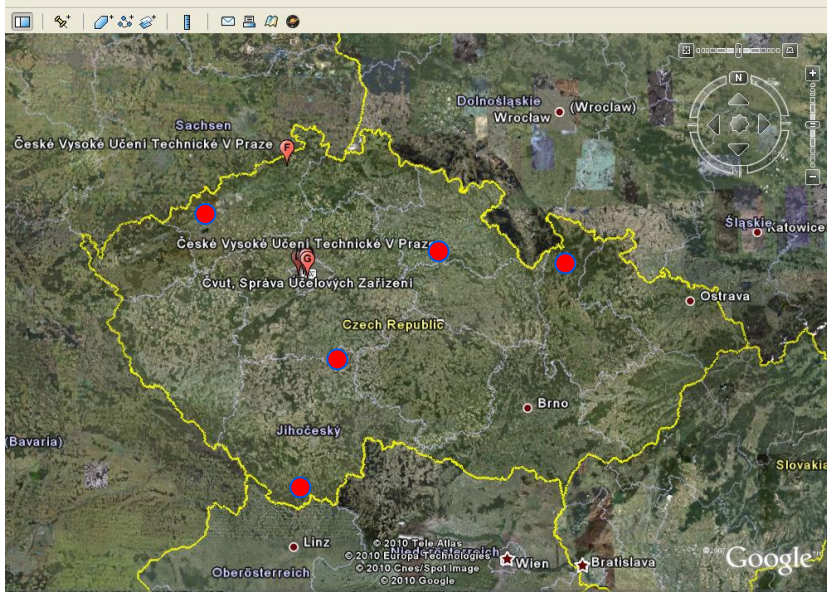
CTU in Prague Objectives

- Attract maximum of fresh talents

- Deliver excellent education

- Maintain the established brand name

- Optimize teaching models across faculties

ABB University Objectives

- Remain close to customers

- Maintain a corporate identity

- Synergies across all divisions and countries

- Optimize business processes & tools

- Eliminate internal competition

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Blended Learning – combine delivery methods

- **Classroom training**
  - Worldwide locations
- **On-site training**
  - Conducted at a plant site or other suitable training facility
- **Virtual Classroom training**
  - Real-time interaction with live instructor and application sharing via computer
- **Web-based training (WBT)**
  - Online access and completion of courseware modules

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On-site Training Example

Diese Information geht an Kader - MA der Funktionsbereiche:
01Forschung **02** Entwicklung **04** Projektmanagement/Marketing/Verkauf **11** Management **10** HR (z.K.)

**ABB University
Switzerland**

Werte KollegInnen

Den **Umgang und Einsatz verschiedenster Präsentationsmedien und Tools** beherrschen: wirkungsvoll, stilsicher und gekonnt.
Dies lernen Sie im Kurs ......

CHW060 Präsentationstechnik im Beruf – Medien wirksam einsetzen und effektiv informieren (Version **Deutsch**)
CHW060 Presentation Techniques – Effectively Informing your Business Partners (Version **English**)

Der 2-tägige Kurs richtet sich an **Fach- und Führungskräfte**, ist auf das ABB Umfeld zugeschnittenen und wird von André Bischoff, Präsentationstrainer und Managing Director von HPS Schweiz durchgeführt, ein seit über 20 Jahren führendes Spezial-Trainingsinstitut.

Details zum Kurs und die Möglichkeit sich anzumelden finden Sie unter folgenden Links:

klick -> CHW060   nächster Kurs in **Deutsch**: **Mi+Do, 20. + 21. Okt. 2010**

click -> CHW060   next course in **English**:   **Tue+Wed, 7 + 8 Dec 2010**

Auskunft erteilt Markus von Allmen, PS-BT (5 66 00).
Anmelden können Sie sich über obigen Link oder per Lotus Notes bei: Anni Gurini, Tel. 058 – 589 32 25
(bitte leiten Sie diese Mail an Interessierte oder Ihre MA weiter)

Wir würden uns freuen, von Ihnen zu hören.

Mit freundlichen Grüssen

Markus von Allmen
ABB University
Lerncenter Business Processes

<u>P.S.:</u>

ABB University im **Internet**:
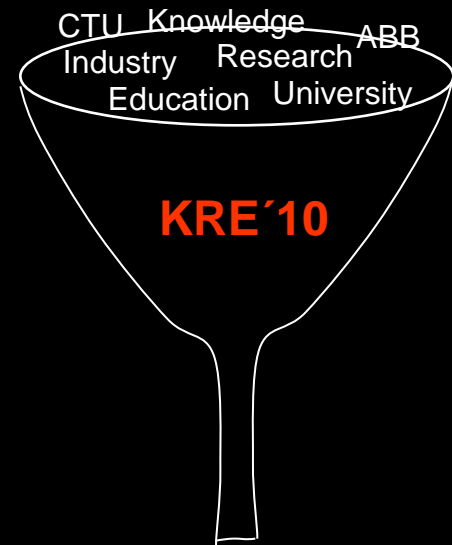ABB University Switzerland on Internet

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Education

- Industry is already teaching worldwide (close to customers)

- The best Universities are also going global (operate all over the world)

- Growing role of

  → on-line and remote information services and infrastructures

  → e-learning

  → worldwide searching for talents (especially in technical fields)

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Summary

Summary – Current situation

The level of services provided by CTU Library is excellent (my personal view), but

- Access to information is fast as has been never before,

- Amount of digital information to be processed on daily basis is enormous,

- Our operations (teaching/servicing) are more and more remote (global),

- Our „customers" (students/buyers/users) are all over the world,

- Technical fields need to gain back at least a part of their attractivness, …

Consequences

→ Growing role of on-line and remote information services and infrastructures,

→ Increasing demands on the flexibility of librarians and their services,

→ Increasing demands on the skills of users and providers,

→ Increasing efficiency of search engines is a must,

→ Increasing role of e-learning,

→ Cost is a limiting factor, both in the Industry and Academia,

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Summary – Claims against Libraries

- **Provide state-of-the-art services**

→ Provide maximum possible on-line and remote information services

→ Provide search engines with high efficiency

→ Enlarge the portfolio of sources, e. g. Patent database, all prominent publishers should be available, digitize old publications, books, …

- **Learn and teach new skills**

→ Build your teams for required skills and flexibility

→ Understand "customer" needs – present, future, latent

→ Stay close to enthusiastic "customers" – scientists, teachers, students

→ Be step ahead of them

→ Train your "customers" / be involved in university teaching

→ Be open and brave to changes

- **Logistics and Management**

→ Continue in joint usage of resources for a wider portfolio of services (cost efficiency)

→ Cooperate closely with IT specialists

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Summary – Claims against Management

→ **Assure continuous and sufficient financial support** (stability)

→ Negotiate alliances with other subjects for joint usage of information sources

……………

………………

…………………

→ Stimulate appropriate technical level and skilled labour in Libraries (Prestige),

→ Stimulate the growth of the Univeristy (Level of Library)

→ Require the usage of efficient business processes and tools (Efficiency),

→ Support the understanding of strategic value of state-of-the-art technologies

for Libraries and their services

→ Move bibliometric evaluation from Faculties to Libraries

(Independent judgement, unification, enpower the position of Library…)

Thank you for your attention…

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