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V A I 

24th Conference of Rectors of European Universities of Technology
Bruno Lindorfer; Paris, September, 2005

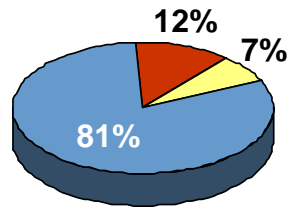
**An Engineer's View on
Modern Curricula of
Universities of Technology**

SIEMENS VAI is one of the world's leading engineering, plant building and automation companies for the global iron & steel industry, and the aluminum rolling sector.

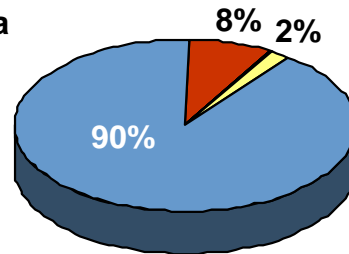


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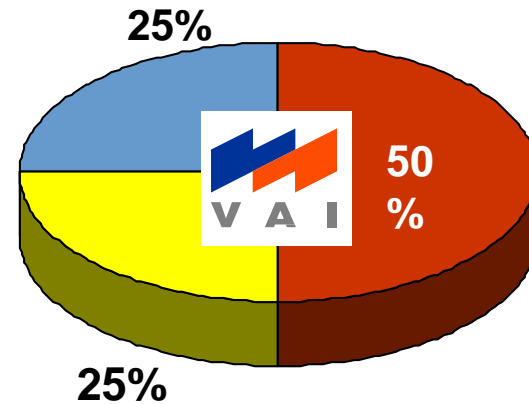
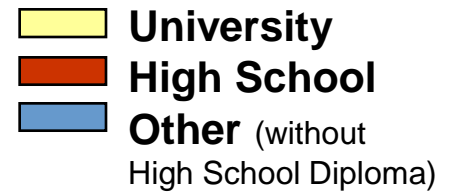
Educational Portrait of SIEMENS VAI Linz



**Education of
Employees in Austria**



**Education of
Industry Employees**



CV Bruno Lindorfer

- **Master in Mechanical Engineering at the Technical University of Vienna in 1980**
- **1980 – 1987: VOEST-ALPINE AG, Linz/ Austria: Department for development of scientific engineering software**
- **1987-1990: ENGEL Machinery, Austria: Head of CAE**
- **1990 – 1997: VOEST-ALPINE Industrieanlagenbau Linz(VAI) Head of R&D for Continuous Casting Machines**
- **1997 – Mid 2005: Senior Vice President Corporate Innovation VAI Linz**
- **Since Mid 2005: Senior Vice President Corporate Innovation SIEMENS VAI Linz**

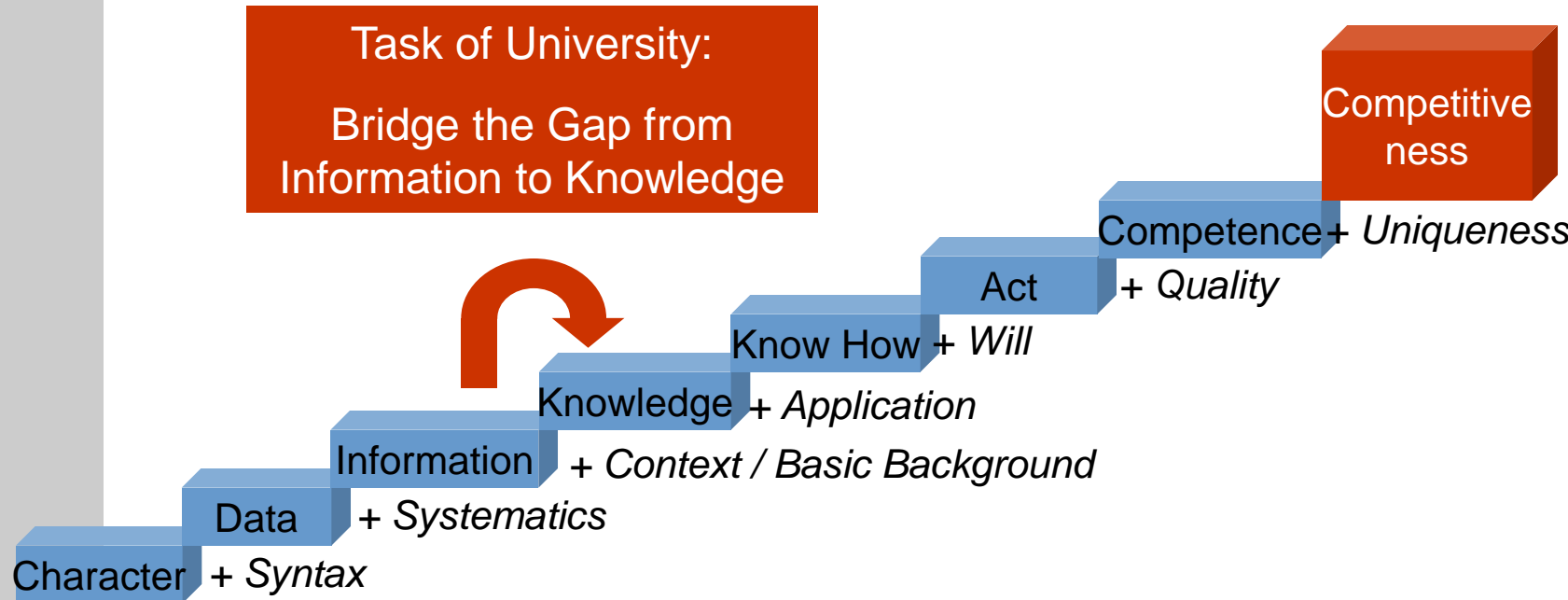
Several Functions within the Austrian Innovation System, e. g.:

- **Vice President of the Christian Doppler Research Society, Vienna**
- **Member of the advisory board of the Austrian Applied Research Funding Institution (FFG)**
- **Associate lecturer for Innovation management at the University of Leoben as well as at the Johannes Kepler University Linz**

- **The World has become GLOBAL – thus so has education**
- **Europe´s major weakness - compared to the US - in the global innovation competition is the poor and SLOW TRANSFER of R&D results into BUSINESS SUCCESS.**
- **When looking on China´s booming industries, reclaiming innovation leadership (at least in several key technologies) is not a question of options or possible considerations, but a question of survival of Europe**

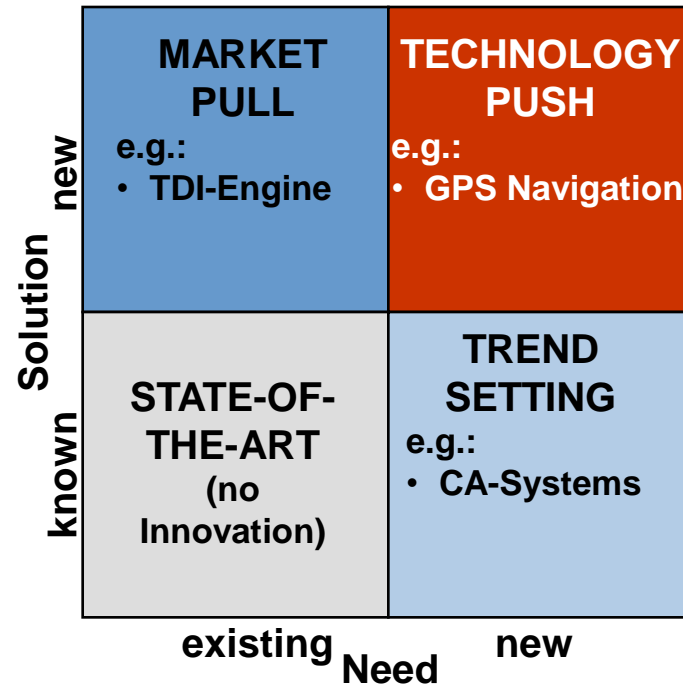
- **FAST INNOVATION** is a key success factor for Europe's competitiveness ("Innovation Leadership")
- **KNOWLEDGE** (and its fast dissemination and utilization) is one major element of innovation
- **Universities** have to bridge the gap between **INFORMATION** and **KNOWLEDGE**

The Steps to Knowledge and Competitiveness



- **Strategic and deep alliance of
Research & Teaching**
- **Teaching the sound theoretical principles of the
engineering sciences
(knowledge with a long half-life period)**
- **Mediation of the skills and competences
„how to transfer information into knowledge“**
- **Providing the basis for
TECHNOLOGY PUSH INNOVATIONS**

Innovation – Types / Definition

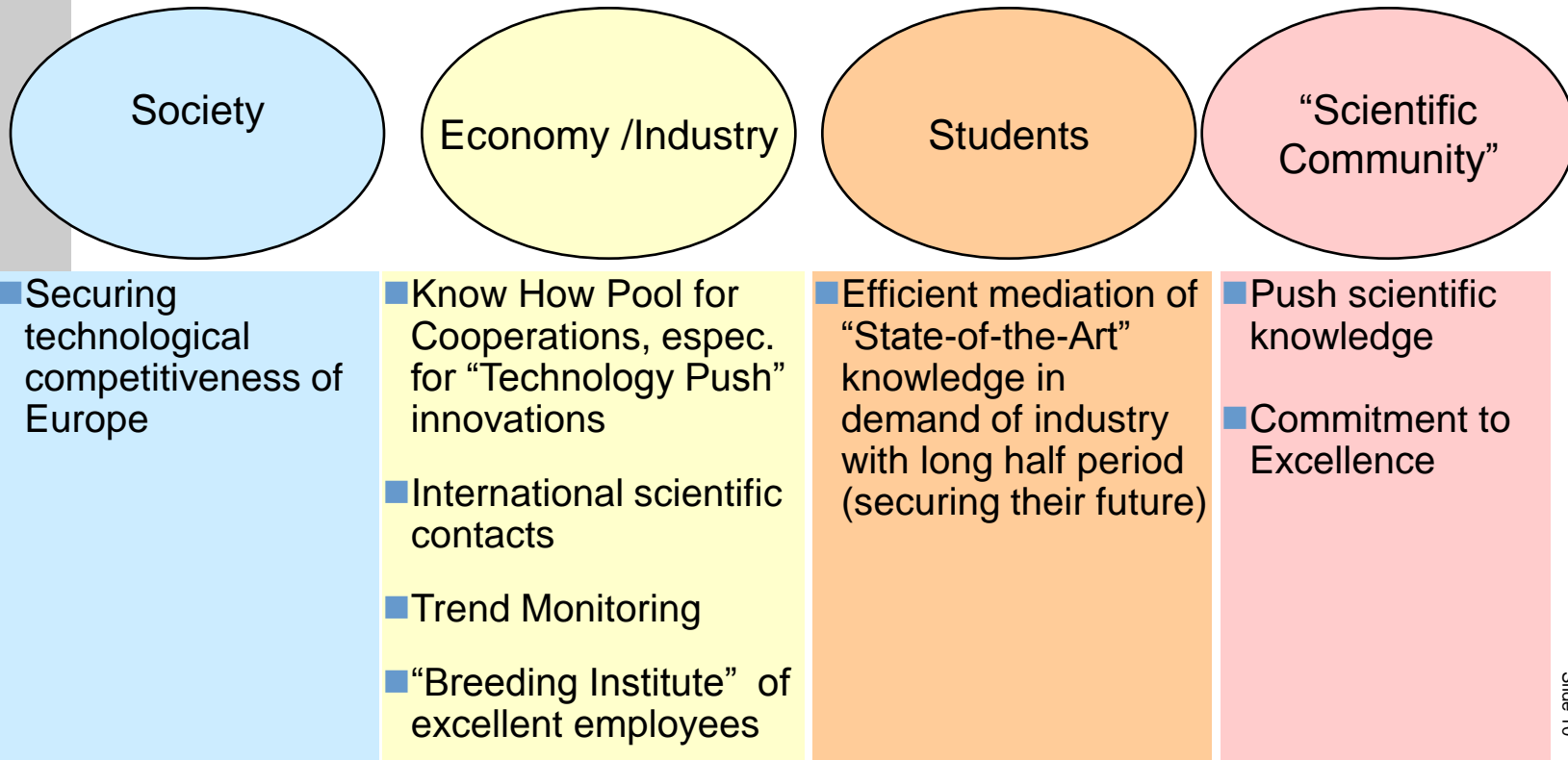


Innovation (Definition):

All steps, from the idea thru the first commercial application as a saleable, new product, process or service.

Basic Rules for Reformation of any Institution

- The Stakeholder / Customers and their Demands have to be in the Focus in any strategic Reformation of any Institution
- The Technical Universities have the following four major Stakeholder / Customers :



„BOLOGNA“

- **Issue Literacy/Knowledge vs Education/Training**
The answer is:
Literacy/Knowledge AND Education/Training
(instead of either / or)
- **I personally have always rather been in favor of teaching the theoretical principles of the engineering sciences (like maths, thermodynamics, etc.) in the first 5-6 semesters and build thereupon the applied engineering sciences.**

- **With this approach the curricula of the technical universities had a clear, natural and logical distinction from the polytechnic colleges.**
- **For me - being a Senior Vice President for R&D in industry - it has always been the logical way, to start out with a sound basis and then build the applications thereupon !**

*However, we
can save
700 lira and
two months
by not taking
soil tests!*



„BOLOGNA“

<p>I thought that BOLOGNA really standardizes the curricula within Europe</p>	<p>I learned that this will not be the case. E. g. the Austrian UOG 2002 prescribes ≥ 180 ECTS for a Bachelor, whereas in Germany only the total ECTS for (BA-MA) are prescribed. E. g. the ECTS points required for a doctorate differ from 120 ECTS to 240 ECTS.</p>
<p>I thought that BOLOGNA's bachelor and master are compatible with US bachelor and master.</p>	<p>I learned that this will not be the case. In US a bachelor typically lasts 8 semesters. EU's bachelor with 6-7 semesters will not be accredited in the US. In the US one can directly go from BA to Ph.D., whereas in EU the Master as an intermediate step is obligatory.</p>
<p>I thought that BOLOGNA substantially reduces the duration of master or doctorate studies at European Universities of Technology</p>	<p>I learned that this will not be the case. Industry needs young aggressive engineers. Usually young people are most productive in the age of 22 to 30. In Europe the studies are lasting too long. Many engineers leave the universities at the age of over 30 !</p>

Summary / Conclusion

- **The “business of teaching” will become more and more a global competition**
- **Reinforce teaching of the skills and competences “how to transfer information into knowledge”**
- **The goal must be Literacy/Knowledge AND Education/Training (instead of either / or)**

Summary / Conclusion

- **Bologna curricula: Technical Universities should insist and reinforce teaching the sound theoretical principles of the engineering sciences to the benefit of sustainability and in taking the responsibility of teaching the students knowledge with long half-life period (“guaranteed future”)**
- **Focus has to be given to shorten the average duration to a master degree engineering sciences. It should not last longer than 10-11 semesters, because industry needs young and aggressive engineers. The so called practical subjects and information should be reduced, because they outdate quickly anyhow and are too broad to be covered encyclopaedically.**

Another Lesson which we can learn from the Chinese

***If you have to provide for one year ahead,
then seed rice,***

***If you have to provide for a decade ahead,
then plant trees,***

***If you have to provide for a century ahead,
then educate people !***

Tschunag-Tse

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Thank you very much for your attention.