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MARKET ENTRY OF INNOVATIVE PRODUCTS USING KNOWLEDGE ACQUIRED BY MATERIALS SCIENCE AND ENGINEERING

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INTED 2013, 7th International Technology, Education and Development Conference, Valencia, March 4 – 6, 2013



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Content:

1. INNOVMAT & Cross-border High-tech Center

2. Knowledge transfer management

- ✓ INNOVMAT | academy
- ✓ INNOVMAT | contactor
- ✓ INNOVMAT | expertise

3. Market entry for innovative functional engineering materials in B2B marketing

- ✓ High-tech marketing capabilities / failures
- ✓ Challenges
- ✓ Knowledge collaboration
- ✓ Interdisciplinary education system

4. Conclusions



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...is platform supporting
transfer of knowledge
aimed at the industrial
applications of advanced
engineering materials

**CHC – Cross-border
High-tech Center is
Marketing Test Bed (MTB)
supporting market entry
of high-tech innovations**

in the region of Vienna - Bratislava

Objectives:

- ✓ to initiate cooperation between Austrian and Slovak R&D institutions in identifying of appropriate industrial applications for newly developed engineering materials and support industrial production of innovative products with extremely high added value,
- ✓ to establish the cross-border platform for knowledge transfer in the field of advanced engineering materials with Marketing Test Bed supporting market entry of high-tech innovations,
- ✓ increase the innovative potential and competitiveness of businesses based on high-tech in Europe.



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Successful industrial applications of advanced engineering materials developed by IMMM SAS



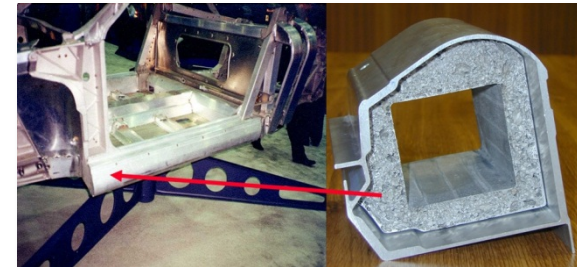
Al-foam crash absorber for railway carriage



Stator ring of camshaft position adjuster
 SAPA Profily Inc. Žiar nad Hronom for BMW engine (900 000 pieces/year)



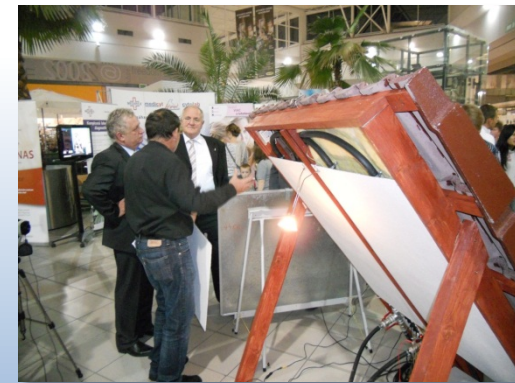
Al-foam stiffeners protected against rear impact
 Audi Q7 (200 000 pieces/year)



Al-foam stiffener of hollow car frame
 Ferrari Modena (6 000 pieces/year)



Heating/cooling wall and ceiling panels utilizing aluminium foam as effective heat spreader





innovmat - platform aimed at the application of advanced engineering materials in the region of Vienna – Bratislava is created by co-operation of:

- ✓ Institute for Economic Promotion, Austrian Federal Economic Chamber, Vienna, Austria www.wifi.at
- ✓ Slovak Chamber of Commerce and Industry, Bratislava, Slovakia www.scci.sk
- ✓ Institute of Materials & Machine Mechanics, SAS, Bratislava, Slovakia www.umms.sav.sk
- ✓ Vienna University of Technology, Austria www.tuwien.ac.at
- ✓ Slovak University of Technology, Bratislava, Slovakia www.stuba.sk
- ✓ Automotive Cluster – West Slovakia www.autoklaster.sk



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... offers:

- ✓ **Troubleshooting:** assessment of specific needs by experts in material research (appropriate expert is able to solve material problems of industrial enterprises)
- ✓ **Search of experts:** virtual network of professionals provides direct access to experts, equipment and services in the field of engineering materials, technologies of their production and processing, legal issues, grants, etc.
- ✓ **Expertise:** workshops on current topics of material research and technological development offer an overview of current trends
- ✓ **Implementation:** support of the funding and legal issues (intellectual property, preparation of license agreements, etc.) during cooperation in R&D through consultations and manuals
- ✓ **Looking for partners:** mediation of contacts through the cross-border cooperation B2B meetings of R&D institutions and industrial SMEs



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Workshops organized by **innovmat** academy

- ✓ **Competitive Advantages through Simulation & Modelling of Materials**
Wien, Austrian Chamber of Commerce, 5th April 2011
- ✓ **Sustainable Material Selection, Material Data Management and ECO Design**
Wien, Austrian Chamber of Commerce, 4th October 2011
- ✓ **Materials and Technologies for Lightweight Design**
(Workshop with special session devoted to topics related to TT)
Smolenice Castle, Slovakia, 13th – 14th December 2011
- ✓ **Recent Developments in the Field of Magnesium and its Alloys**
Wiener Neustadt, Austria, 26th January 2012
- ✓ **Advanced Carbon Materials for Electronics and Tribology**
Bratislava, Faculty of E&IT STU, Slovakia, 26th April 2012
- ✓ **Progressive Methods and Technologies of Preparation, Processing and Diagnostics of Materials**, Trnava, Faculty of Materials Science and Technology STU, Slovakia, 10th May 2012
- ✓ **Innovation in View of Production Technologies and Materials**
Smolenice Castle, Slovakia, 21st May 2012
- ✓ **Innovation in Surface Treatment of Materials**
Kočovce, Slovakia, 12th June 2012
- ✓ **Innovations in Polymer Materials**
Bratislava, Faculty of Civil Engineering STU, Slovakia, 14th February 2013
- ✓ **Supporting of Entrepreneurs in Market Entry of Innovative Products**
Smolenice Castle, Slovakia, 18th March 2013



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Innovation days
with B2R&D
meetings:

www.innovmat.eu

- ✓ Bratislava, Slovakia, 21st November 2011
- ✓ Vienna, Austria, 14th June 2012

WKO
AUSSENWIRTSCHAFT ÖSTERREICH

New Materials & Material Technologies

Latest trends | Find your experts - get your solution

HOME HOW IT WORKS AGENDA CONTACT June 14th, 2012 | Vienna, Austria

Register
or sign in

Participants
Search
Show All

B2B Meetings
[Overview](#)

| Participants | |
|-----------------|-----------|
| Austria | 32 |
| Czech Republic | 3 |
| Slovak Republic | 24 |
| Total | 59 |

Bilateral Talks

| Participants | |
|--------------|----|
| Participants | 48 |
| Meetings | 67 |

Profile Views

| Before Event | 1348 |
|--------------|-------------|
| After Event | 1361 |
| Total | 2709 |

Collaborate » Innovate » Grow

Boost your business with innovative materials and material technologies - Gain new opportunities and competitive advantages through co-operations in R&D. Attending this B2R&D and B2B event organised within **INNOVMAT** project will give you easy access to scientists and enterprises in the field of materials and material technologies. Take your chance to innovate

Event Focus

- Latest trends in materials and material technologies
- Get to know key R&D players offering services to companies
- Get your problem solved - Matching organizations offering or seeking solutions
- See an exhibition of successful examples of B2R&D co-operations

Main topics

- Metals and alloys
- Composite materials
- Hybrid materials
- Polymers
- Natural materials (Wood)
- Ceramics/Glass

Program

Key Note Speeches - new materials, new changes

10:00-12:00

- Hon. Prof. Dkfm. Dr. Rainer Hasenauer, Vienna University of Economics and Business
„Market Entry for High Tech Innovations - Methods and Experience in B2B Markets“
- Dr. Nils Stelzer, Aerospace & Advanced Composites GmbH
„Advanced Composites for Space, Aerospace & Earth“
- Milan Skrobán, Sapa Profily a.s.
„The benefit of research activities on the competitiveness of manufacturing company“

Organisers

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BRATISLAVA
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BIC Bratislava
INITS, a.s.



Innovation Day organized
by **innovmat** in November 2011 in Bratislava



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Networking of experts using professional social business networks:

✓ **LinkedIn** www.linkedin.com

✓ **XING** www.xing.com



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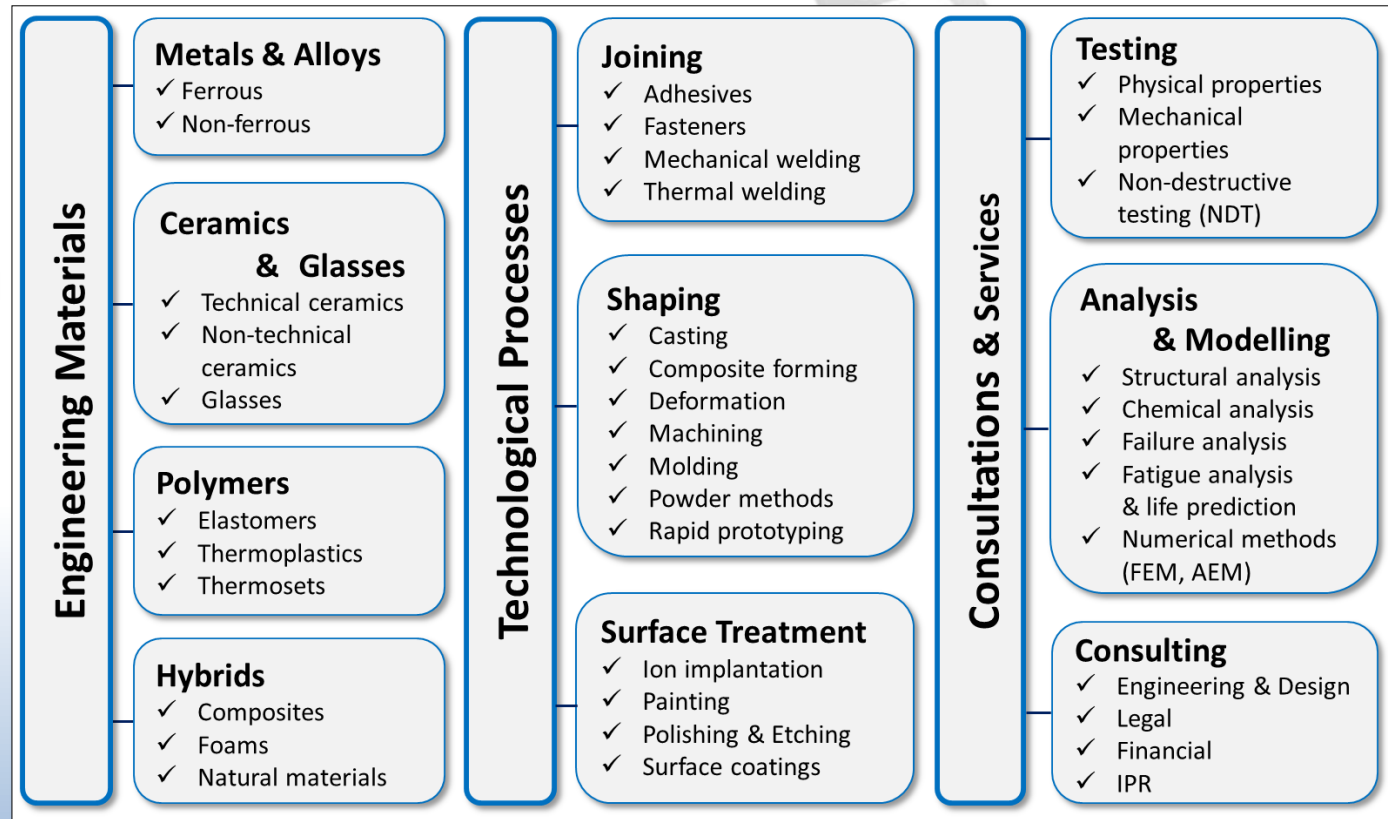
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... database of experts, scientific equipment and services related to the materials science in Central European region:

... offers

easy access to newly developed engineering materials, advanced technologies and related services with the aim to support innovations of industrial products and processes





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| Knowledge Holders / Sources, Recipients | Knowledge Transfer Success | | | |
|---|----------------------------|--|--|---|
| | innovmat | CHC cross border hi-tech center | | |
| | | 1.MARKETABILITY | 2. MTB | 3.MDC |
| | | Teaching criteria of marketability | Method of marketing testbed | Training of multi-disciplinary communication |
| | | Offering access to buyers and partners | Find partners for marketing testbeds | Improve MDC by accessing contacts |
| Seller | innovmat academy | Check innovation half life of functional materials | Check innovative USP's with lead users | Build up efficient expertise networks using MDC |
| Buyer | innovmat contactor | | | |
| Competitor | innovmat expertise | | | |
| Marketing | | | | |
| Technology | | | | |
| Finance | | | | |



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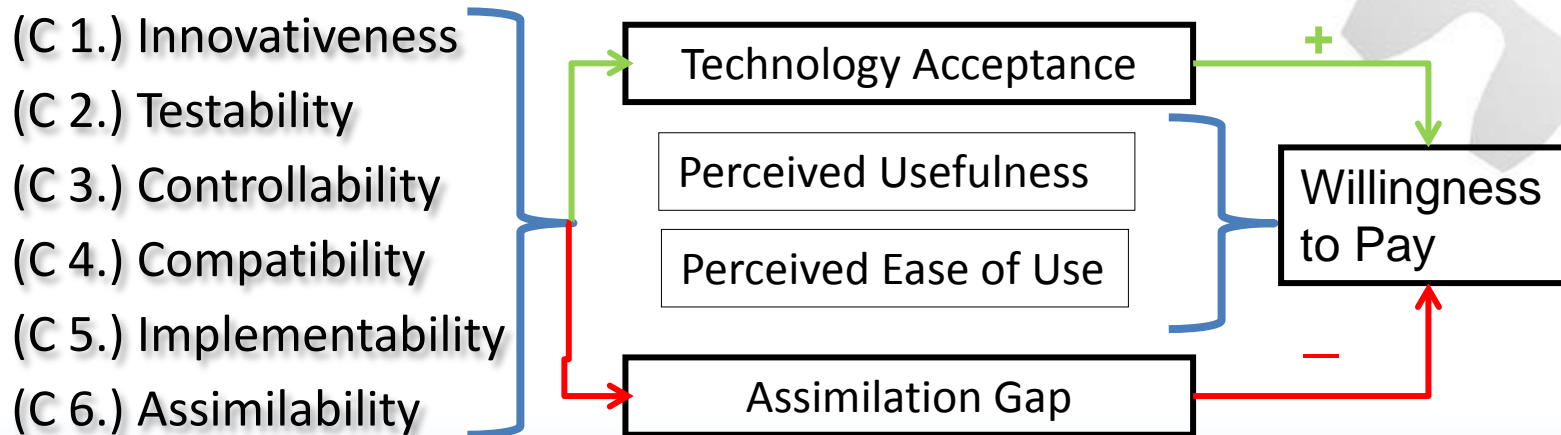


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Market entry for innovative functional engineering materials in B2B marketing



1. Criteria of High-Tech innovation marketability:



- ✓ Cross-functionality is a proven economic success factor in high-tech innovation and implies communication between multiple knowledge disciplines.
- ✓ The buying / selling center is represented by a multidisciplinary buying / selling team.



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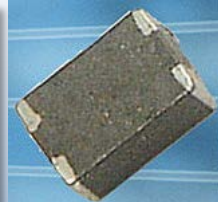
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Innovation readiness and resistance



| Innovation hurdles (<0) / drivers (>0) | | Perceived specification of: | | | | | |
|--|------------|-----------------------------|----------|----------------------------------|-------------------------|----------------|-------------|
| fictious example | Innovation | Innovation half life | Testable | Controll-able compliant to goals | Compatible to standards | Implement-able | assimilable |
| low -1 high +1 expected benefit | usage | 0,6 | 0,8 | | +1 | + 0,8 | +0,9 |
| | value | 1 | | | | +1 | +1 |
| | risk | -0,7 | -0,8 | -1 | +0,2 | -0,1 | +0,2 |
| | image | | -1 | | | | |
| | routine | | | -0,5 | +1 | | |



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Multi Criteria Marketability approach

is the basic requirement for economically viable high-tech innovation. It strongly depends on the communicability of the innovative features demanded by the addressed customer segment

Marketability criteria of high-tech innovation are described by:

- Innovativeness,
- Testability, Controllability, Compatibility,
- Implementability, Assimilability.

In B2B marketing evaluated criteria heavily influence company's buying behavior. The buying decision for a high-tech innovation is multi-criteria. Accordingly market share and technological leadership exert influence on speed, direction and quality of percolation / anti percolation of innovation through the addressed market segment [5, HASENAUER].

[5] HASENAUER, R. - FILO, P. - STÖRI, H. The marketing of high-tech innovations: research and teaching as a multidisciplinary communication task. In M-Sphere Dubrovnik 2012: 1st International M-Sphere conference - Zagreb: M-Sphere – Association for promotion of multidisciplinary in science and business, 2012. p. 50. ISBN 978-953-99762-9-1.



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Examples:

metal foams

cellular materials (hollow half spheres)

Additive manufacturing materials (inner bone structure)

DLC (diamond like carbon)

bionic surfaces for surf boards

Phase change materials for light weight construction, wearable computing, functional skins, etc.



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The resulting cross industry product prototype is a sandwich for integrated, autonomous wearable computing, combined with phase change material.

The solution offers temperature regulated functional “outer skin”.

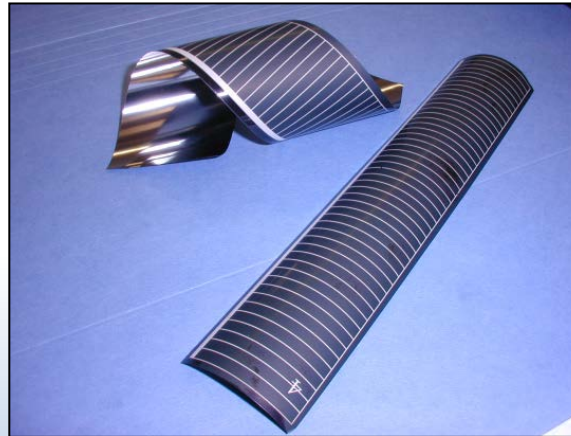


GLOBAL
SOLAR



Flexible PV Module produced
by Global Solar Energy Inc.

GLOBAL
SOLAR



Thin film photovoltaic cells produced
by Global Solar Energy Inc.

Leclanché



Flexible battery
Leclanché Lithium GmbH



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2. Marketing Test Bed (MTB)

is the second approach in CHC which is a multidisciplinary, experimental approach in B2B marketing to support market entry of High-tech Innovation based on qualitative market research procedures such as problem-centered interviews and focus groups. The MTB configuration uses community-based innovation (CBI) and open innovation (OI) [28, CHESBROUGH] approaches and applies technology acceptance (TAM) [29, DAVIS] Perceived Usefulness, Perceived Ease of Use, and User-Acceptance of Information-Technology [30, RATCHEVA], technology resistance models [31, RAM] and window of opportunity [George Day].



-
- [5] HASENAUER, R. - FILO, P. - STÖRI, H. The marketing of high-tech innovations: research and teaching as a multidisciplinary communication task. In M-Sphere Dubrovnik 2012: 1st International M-Sphere conference - Zagreb: M-Sphere – Association for promotion of multidisciplinary in science and business, 2012. p. 50. ISBN 978-953-99762-9-1.



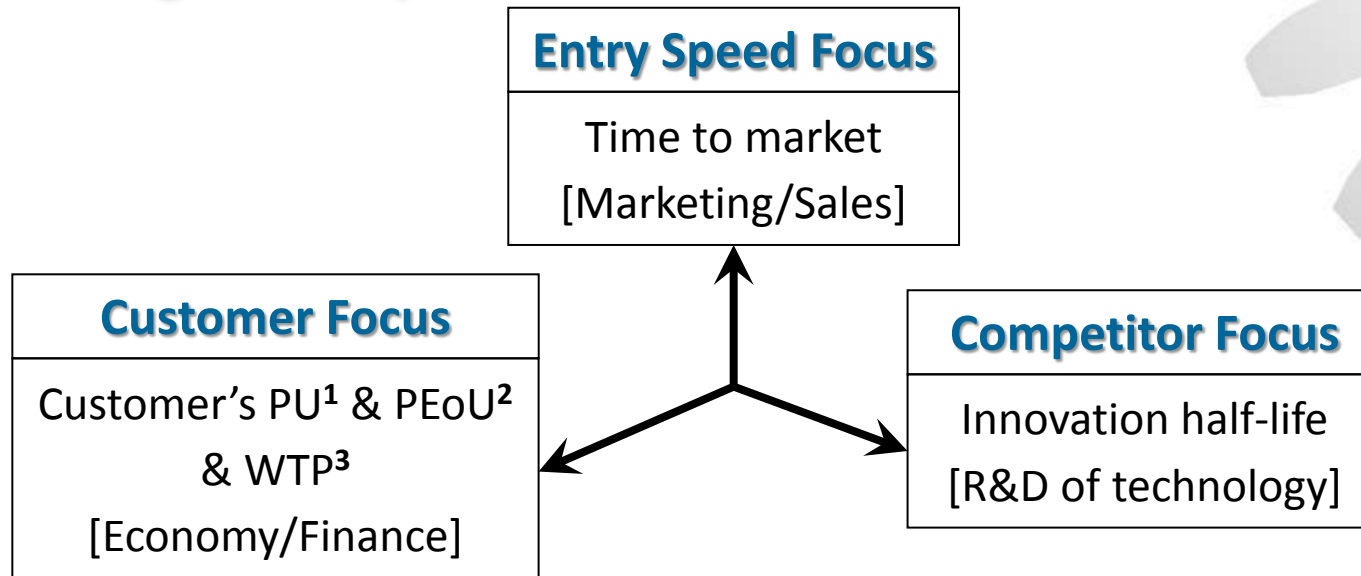
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Marketing Test Bed as multidisciplinary experimental approach to market entry of High-tech products



The management communication process in this context shows a quite complex multidisciplinary structure. The conflicts in goal attainment caused by resource shortage must be solved by a multidisciplinary dialogue, focusing on multidisciplinary resource usage.

¹ PU Perceived Usefulness

² PEoU Perceived Ease of Use

³ WTP Willingness to Pay



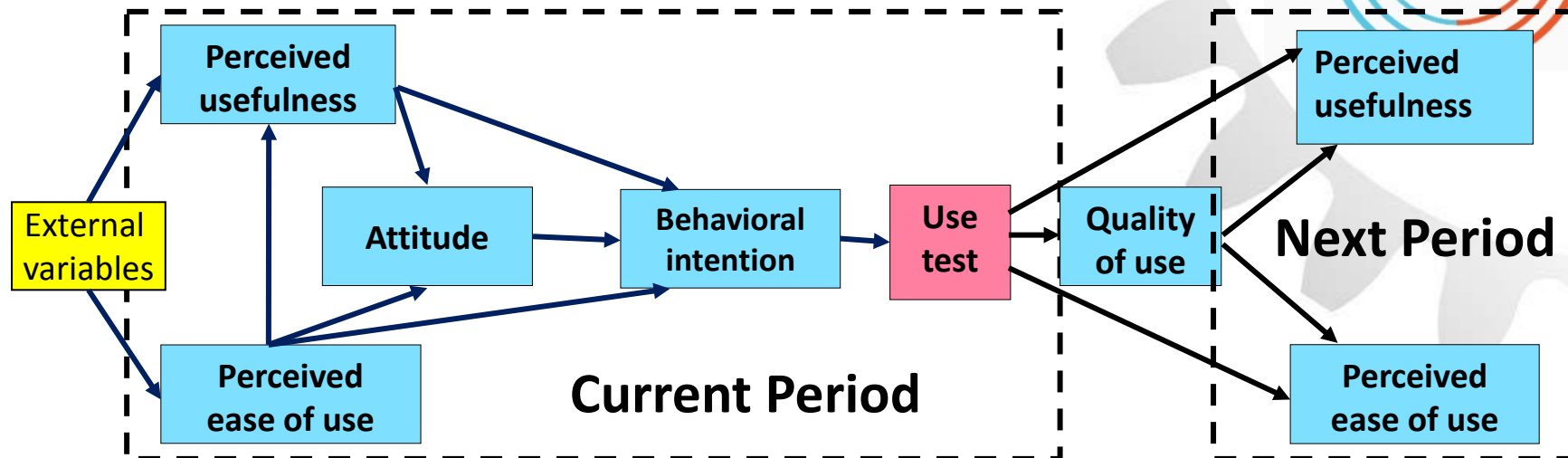
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Technology acceptance



Structural changes of the surface with bionic derived "BIOSURF" structure (ESKA Implants GmbH)



(Global Solar Inc.)



LCE 2007



42 kW Cellstack
(Sumitomo Electric Industries, Ltd.)

Marketing Test Bed as multidisciplinary experimental approach to Market Entry of High-tech products



Example 1: MTB for medical care robot for post-operation rehabilitation:



CCPM device:
Continuous
Compliant
Passive
Motion

<http://ferrobotics.at>

Example 2: MTB for hazard detection robot in fire-fighting & underground coal mining.



<http://www.taurob.com/de/produkte>

Example 3:
MTB for auto-adaptive temperature regulation by phase change material in building materials application



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3. Multidisciplinary Communication (MDC)



In order to create effective knowledge transfer, knowledge collaboration and common language / standard INNOVMAT and CHC apply MDC in B2B marketing, which is an effective communication between engineering and marketing. The partners who belong to different knowledge disciplines exchange their views on content from different disciplinary viewpoints [5, HASENAUER].

Thus **MDC has competencies in learning and collaborating with entrepreneurship, education and technological development at the same time.**

[5] HASENAUER, R. - FILO, P. - STÖRI, H. The marketing of high-tech innovations: research and teaching as a multidisciplinary communication task. In *M-Sphere* Dubrovnik 2012: 1st International M-Sphere conference - Zagreb: M-Sphere – Association for promotion of multidisciplinary in science and business, 2012. p. 50. ISBN 978-953-99762-9-1.

Selected semiotic aspects of MDC in High-tech Innovation Marketing



EXAMPLE: Electrical Energy Storage Innovation Project: MDC Requirements

| Know How requirements | Electrochemistry Applied Physics | Electronics & electrical engineering | High Tech Innovation Marketing |
|---|---|--|--|
| Semiotics | A | B / C | D |
| Syntactic | Stoichiometry, CFD (computational fluid dynamics) | IC-Logic, rule set of electrical engineering, | Market response function model, social percolation, diffusion models |
| Semantic | V ₂ O ₅ : Divanadium pentoxide; electrolyte concentration, graphite surface | Charging/discharging, electrolyte lifetime, thermal behavior, environmental conditions | TAM, WtP, Price Model, Business Model, Marketing Mix Model. |
| Pragmatic | Self-discharge=>Min.! Energy density > 250mWh/cm ³ | Availability > 99,99% Charging time < 3 hrs. DoD ¹⁾ > x% | Optimize ROI! Min TTM! Optimize ROS! Max IHL! s.t. PU! & PEOU! |
| How to cope with mutual goal conflicts? How to design MDC? | | | |

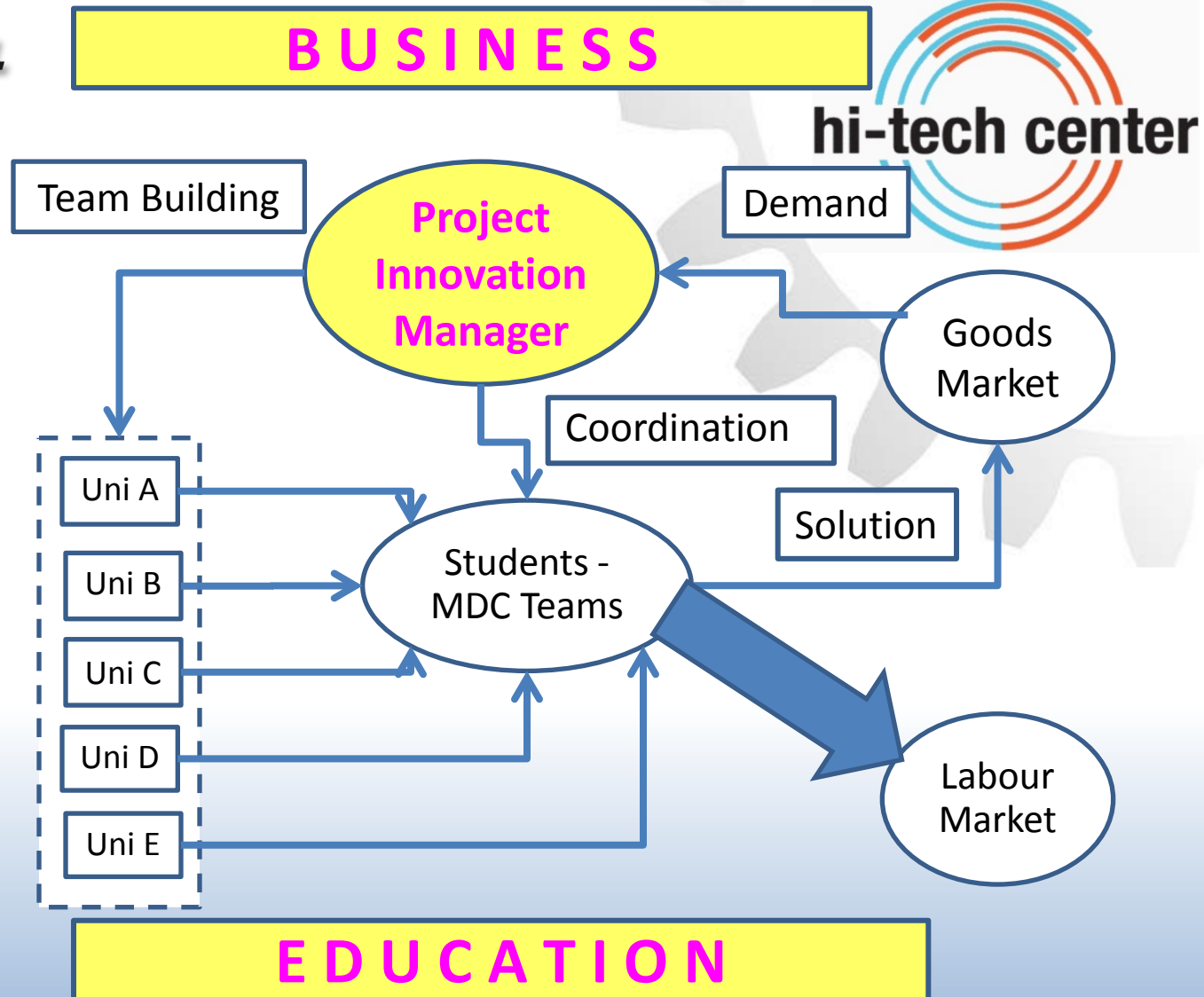
¹⁾ DoD: Degree of Discharge



Conclusion innovmat

Our
experience –
(external)
**Project
Innovation
Management**
helps with
MDC in the
triangle
**SCIENCE –
EDUCATION –
BUSINESS**

SCIENCE



hi-tech center



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| Marketing Technology Finance | innovmat contactor | | | |
| | innovmat expertise | | | |



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A ROZVOJA VIDIEKA
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bmwfi
Bundesministerium für
Wirtschaft, Familie und Jugend



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