

FRAUNHOFER CENTER FOR INTERNATIONAL MANAGEMENT AND KNOWLEDGE ECONOMY

Annual Report 2014/15

INTERNATIONAL MANAGEMENT AND KNOWLEDGE ECONOMY





Annual Report 2014/15.

Fraunhofer Center for International Management and Knowledge Economy



"WE ARE THE ECONOMISTS OF FRAUNHOFER."

New∎ Name∎ **Services**

In Leipzig, the name "Fraunhofer" is synonymous with applied research. The city, one of Germany's leading trade show and exhibition locations, is home to two centers: a technological institute - our sister center, the Fraunhofer Institute for Cell Therapy and Immunology (IZI), and us, the Fraunhofer economists. The Fraunhofer Center is located right in the middle of Leipzig, which is celebrating its millennium in 2015, and last year observed the 25th anniversary of the Peaceful Revolution – in which it played a major role. Located in the immediate vicinity of Leipzig University and its Faculty of Economics and Management Science, business and political economists, political science and Organizations in Germany and emphasize this fact humanities researchers and engineering management graduates have been conducting research innovations and the internationalization of business and research sectors of both politics and society for almost 10 years now.

We see ourselves as the Fraunhofer-Gesellschaft's international institute; a fact not least proven by the international character of the institute's members. Our team of 120 colleagues comes from 16 different countries. The "International Summer Internship" Program offered by our institute for the past two years brings students from internationally recognized universities to us for a three-month internship. We show them that science is international period - that, the the Fraunhofer applied research approach. And because research is active in society and for society, this internationality extends beyond the threshold times when people fleeing their homes settle here in Germany, this internationality claim stands for a new sense of responsibility and obligation. We in Germany must be good hosts. Our livelihood depends on foreign trade; it strengthens our economic growth, secures our role in the global economy and our prosperity.



Professor Dr. Thorsten Posselt itute Directo

We must urgently address the issue of immigration. Immigration can be organized according to economic and to humanitarian aspects – it is appropriate that a wealthy country like Germany should find a sensible balance between both. For this reason, we unreservedly support the statement by the Alliance of Science clearly in our annual report.

We have undergone major structural and subject-related developments since our establishment in 2006. We have grown from a research center that primarily brought together political, social and economics researchers from Germany and Central and Eastern Europe into a sought after partner for companies, regions, institutions and governments – in Europe and around the world. Our researchers develop strategies, options for action and policy instruments for our clients that enable them to respond appropriately to the challenges and opportunities of globalization.

In 2014 and 2015, our activities focused on the in fact, it has to be. They soon become familiar with repositioning of our institute, on the establishment of new business fields and on the expansion of the service portfolio. Our core expertise in "international management" and in the "knowledge economy" of the doors to our institute. Especially in current means that of all the Fraunhofer institutes that are not focused exclusively on technology research, we have a crucial role to play. The Leipzig Fraunhofer Center economists are some of the key partners when it comes to contributing to a transdisciplinary approach to research and development in joint projects. Whilst the technical sister institutes conduct excellent research in the fields of engineering, natural and life sciences, this is complemented by the equally excellent work of the systemic institutes – of which we are one – due to our socio-economic perspective. Thanks to our new business areas, we are now able to convert the "raw material" knowledge into practical applications for industry, institutions, regions and governments. We understand markets and we understand companies - and, we know how companies can tap into new markets. Our practical application oriented research and our solutions always focus on specific problems and challenges in business, politics and society – and for this reason, we are an integral part of Fraunhofer. Our new name and our service portfolio describe our economics profile. We are fulfilling the mission to safeguard the international competitiveness of German and European companies.

partners and customers are key to our work. This your feedback. annual report focuses on the projects and the experts behind the research activities.

In 2014, we organized the third symposium of the German Federal Ministry of Education and Research meta project on "Vocational training export by German providers" in Berlin, where the guidelines for the providers of training services developed during the course of project activities were presented. In the same year, the completion of the EU project Climate for Culture was recognized with a final conference and the publication of a comprehensive brochure. Our energy experts have provided sound academic support to Stadtwerke Basel in order to develop the Swiss utility provider further into a municipal electricity supply manager. The project Agent-3D provides insights into arena, in institutions and in society. how we will use materials in future, and how this will alter the value chains. The German-Indian Economic Forum in Leipzig in March 2015 was the first network meeting in this form to be held in central Germany. The opening of the Big Data Center in July 2015 and the analysis of complex data finally allows our approach of "research, development and sound academic advice" to become practical reality for our customers. These



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and other research projects demonstrate the wide spectrum of our service portfolio. You will find the above and other best practice examples in this annual report, which was prepared by our marketing and communication division.

Scientific excellence calls for excellent communication. That is why we have arranged for the Münster University of Applied Sciences Faculty of Design and Leipzig University's Strategic Communication Institute to support us academically from a communication science perspective during the annual report's design and content marketing. Findings from the first Bachelor's thesis in the specialism Communication Design were taken on board in the design and the layout of the presentation. That is why this annual report focuses particularly on the projects of the Leipzig Fraunhofer Center team. These are presented in a magazine style Research excellence and the satisfaction of our which invites you to read them and then to provide

> In 2016, we – the Fraunhofer economists – will be able to look back on 10 successful years at the Leipzig Center. We would like to acknowledge this event jointly with our customers, partners, friends, sponsors and colleagues in the upcoming anniversary year. We look forward to our continued cooperations, to future projects and to joint events. We invite you to help realize the embodiment of applied economics research together with us in the course of future projects and events as the Fraunhofer Center for International Management and Knowledge Economy. We research, develop and advise – on a sound scientific basis – on behalf of you, our customers, clients, partners, supporters and companies in industry, in the political

We hope you enjoy reading this publication, which is brimming with "Knowledge".

Yours sincerely, Professor Thorsten Posselt



An abbreviated version of the following text appears in the 2015/2016 year book entitled "Innovation Key Focus Consulting: Successfully Implementing Industry 4.0".

The 2015/2016 year book will be published on 26 October 2016 to coincide with the "9th Research Colloquium on Innovation & Value Creation".

Industry 4∎0

New infrastructures and business models for the digital economy

Professor Dr. Thorsten Posselt

Business and society are increasingly affected by the digitalization of almost all areas of life. Thanks to digital technologies, companies can now develop completely new marketing channels and thereby unlock currently unimagined sources of income. Even in industrial production, information technology systems will play a central role in the future. Developments range from information systems to support and integrate business processes that identify consumer preferences to the engineering of business models.

No digital economy without a high performance infrastructure

To ensure that the knowledge and capital-intensive German economy remains competitive in the future, public and private actors must continuously invest in Germany as an industry location.

Digital infrastructures form a bridge between the virtual and the physical worlds and are therefore a key investment field for the German economy. Digitalized products and services can only be used and consumed without a detrimental effect on quality if the infrastructure matches user demands (speed, security and reliability).



Otherwise, it would be like racing along an unsurfaced highway at top speed. It can also safely be assumed that the demands on the infrastructure will continue to increase.

The available data on the performance capability of the digital infrastructure shows that by international comparison, Germany has some catching up to do. To support the development of data-based applications and, ultimately, digital business models, more must be invested at broadband network level. The fact is that the development of digital products and services and the setting of the respective benchmarks will occur where the infrastructure is best developed.

New value chains through digitalization

The digitalization of business processes allows the extensive customization of products and services. One of the consequences of this is that manufacturing processes are becoming increasingly flexible. For instance, customer data which has been collected, stored and evaluated makes it possible for companies to analyze consumer behavior patterns. This allows companies to offer more attractive, customized products and services and to increase the customer benefit in a targeted way. In future, these offers can be tailor-made according to location and time, linked to each other systematically, communicated faster or made more personal. In turn, the digital processing of company data makes it possible for companies to network machines and production processes beyond their own possibilities. Whether relating to product development, production processes, quality assurance or logistics - thanks to digitalization, the optimization is system-wide.

Digital business models "Made in Germany"

Germany will not be able to uphold its industrial strength through investments into infrastructure alone. The digitalization of the economy can only succeed if the availability of the infrastructure goes hand in hand with new value chains and business models that are ready for it. Should German companies fail to manage to develop digital business models to the required extent, then established suppliers from other countries will profit from the billions invested into the digital infrastructure, and German products and services will increasingly be



pushed out of global markets. Spacing companies should not be afraid of this scenario, but rather should view it as an opportunity which they must seize. They must develop business models with the "Made in Germany" quality guarantee, that are compatible with European and national values, rules and institutions and are also attractive internationally, i.e. capable of holding their own in a global market. In this context, it hardly matters for products and services where these business models are developed, although it can be crucial where they are employed.

As hesitant as some German companies were at the beginning of digitalization, most of them are now just as committed to its pursuit. In the course of its incorporation, companies would be well advised to build on existing strengths – in terms of business processes, products and services and also where interaction channels are concerned – and to consider the digitalization of their business model right from the beginning. Digital business models are not only employed in telecommunications, the media and entertainment. Particularly industry sectors such as industrial production, healthcare, energy, retailing and also the provision of financial services profit from the wide scope of application. Germany can become the leading market for digitalization in these fields, and export this expertise globally.

In this respect, the degree of digitalization can take different forms. Put simply, the different digital business model types can be categorized according to type of commodity (product vs. service) and supply method (physical vs. virtual). This allows for multiple combination options. At the same time, there is no escaping the fact that the fundamental key to the success of the new business models is the efficient use and analysis of data, which many experts consider to be the "21st century's crude oil". The experts at the Fraunhofer Center for International Management and Knowledge Economy in Leipzig are conducting research into how to optimize the utilization of existing data, how this data can be evaluated in a structured way, and how the penetrability of the flow of information within a company and beyond can be guaranteed.

Norms and standards – the key to and drivers of digitalization

Ultimately, the success of digital business models also depends on internationally accepted norms and standards – not only in terms of business and technology, but also where social and ecological aspects are concerned. They guarantee, for example, the seamless communication between products made by different manufacturers.

The global standardization of processes makes it possible to respond quickly to changes in the market. In comparison to the USA and China, this factor impacts beyond the commonalities shared by the European culture patterns and should be utilized as a unique selling point.



Recommended reading: Increasing Investment in Germany

Report prepared by the Expert Commission on behalf of the Federal Minister for Economic Affairs and Energy, Sigmar Gabriel

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(ltr) Dr. Wilhelm Krull (Chairman of Board of Trustees, Fraunhofer Center Leipzig, Secretary General of the Volkswagen Foundation), Prof. Dr. Thorsten Posselt (Institute Director of the Fraunhofer Center Leipzig), Prof. Dr. Reimund Neugebauer (President of the Fraunhofer-Gesellschaft) and Dr. Fritz Jaeckel (State Minister and Chief of the Sachsen State Chancellery).

Prof. Dr. Reimund Neugebauer (President of the Fraunhofer-Gesellschaft).

Dr. Fritz Jaeckel (State Minister and Chief of the Sachsen State Chancellery).

Klaudia Kunze (Head of Communications, Fraunhofer-Gesellschaft).

PROFILE OF THE LEIPZIG FRAUNHOFER CENTER

Realignment: Fraunhofer Center for International Management and Knowledge Economy

Since its establishment in 2006, the Fraunhofer Center Leipzig has seen some major structural and subject-related developments. It has grown from a research center that primarily brought together political, social and economic researchers from Germany and Central and Eastern Europe into a sought-after partner for companies, regions, institutions and governments both in Europe and around the world. With an international team of 110 employees from 16 different countries, the Fraunhofer MOEZ, called the Fraunhofer Center for International Management and Knowledge Economy since July 2nd, 2015, conducts research on the internationalization of business and science. On the basis of their research findings, the researchers develop strategies, options for action and policy instruments for their clients that allow an appropriate response to the opportunities and challenges of globalization.

"With its core expertise in 'international management" and in the 'knowledge economy', the Leipzig Fraunhofer Center has a key role to play amongst those Fraunhofer institutes that are not exclusively technology research focused," said President of the Fraunhofer-Gesellschaft, Professor Reimund Neugebauer, speaking at an information event about the institute's realignment in early July in Leipzig.

He acknowledged the institute's important contribution to the internationalization strategies of its technology-focused sister institutes: "The Leipzig Fraunhofer Center economists are key partners when it comes to contributing to a transdisciplinary approach to research and development in joint projects. Whilst the sister institutes with a technology focus conduct excellent research in the fields of engineering, the natural and life sciences, the equally excellent work of the systemic institutes – of which this center is one – complete the picture by looking at the socio-economic dimension of technology development."

Professor Thorsten Posselt, the head of the Fraunhofer Center for International Management and Knowledge in Leipzig, added: "Our new name and the spectrum of our services reflect our economics profile. We are fulfilling the mission to safeguard the international competitiveness of German and European companies."

> (ltr) Dr. Wilhelm Krull (Chairman of the Board of Trustees, Fraunhofer Center Leipzig, Secretary General of the Volkswagen Foundation), JProf. Dr. Lutz Maicher (Fraunhofer Center Leipzig), Dr. Fritz Jaeckel (State Minister and Chief of the Saxony State Chancellery) and Prof. Dr. Thorsten Posselt (Institute Director of the Fraunhofer Center Leipzig) at the opening of the Big Data Center



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"With the Big Data Center customers can now digitalize their processes and business models."

PROFILE OF THE LEIPZIG FRAUNHOFER CENTER

Innovation | processes | efficiency – the Big Data Center at the Fraunhofer Center in Leipzig

The Big Data Center of the Fraunhofer Center Leipzig enables the large-scale storage of digital data, thereby supporting the Center's applied research work.

It is increasingly necessary to process large data volumes as part of the research activities of Fraunhofer Center Leipzig. Information from patenting processes is analyzed to determine the competitive environment in which technology companies operate, and business models are simulated or current data from (global/ European) energy markets used to forecast electricity prices. However, if we simply relied upon current data storage options, Fraunhofer Center Leipzig would run out of storage capacity in 2020. Consequently, the Leipzig Fraunhofer Center has made the digitization of its own research work one of its strategic objectives. Data analyses, simulations, real-time forecasts and visualizations have long been an integral part of the innovative solutions we provide to our clients and partners. To ensure that this remains the case in future, Fraunhofer Center Leipzig created a Big Data Center in 2014. With over 224 processor cores and some 450 terabytes of storage capacity, it has more space than would be needed to digitize all the books in the world.

Big Data Center Established

This means that the digitization of clients' processes and business models will enable them to benefit from both the economic expertise of the researchers at the Leipzig Fraunhofer Center and the new technical infrastructure. We have created prototypes to show how smart data can be used to implement digital innovations within companies.



Blog Big Data Center

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Big Data Center at the Fraunhofer Center Leipzig Everyone is talking about big data, which refers to large volumes of simply-structured information. However, properly-functioning business models require smart data, that is, high-quality data that is closely linked to the application context and can be processed for use in solving specific problems.

The dedicated Big Data Center of the Fraunhofer MOEZ is being funded from a range of sources, including the European Union and the European Regional Development Fund.









(Itr) Prof. Dr. Thomas Bruckner (Fraunhofer Center zig), JProf. Dr. Lutz Maicher (Head of Competitive Iligence Unit at the Fraunhofer Center Leipzig), ctor Prof. Dr. Thorsten Posselt and Bruno n (CEO of Deutsche Investitions- und schaft – DEG. German Investment and

Prof. Dr. Thomas Bruckner (left) (Head of the Sustainability Management and Infrastructure Economics Division at the Fraunhofer Center Leipzig) explains its range of services

Institute Director Prof. Dr. Thorsten Posselt, Peter Nothnagel (Managing Director of Wirtschaftsförderung Sachsen, Saxony Economic Development Corporation) and Dr. Friedrich Dornbusch (Research Fellow at the Fraunhofer Center Leipzig).

Trustees in conversation: Dr. Walter Mönig (member of ard of Trustees) and Dr. Peter Claussen (Founder and CEO of the systemic consultancy "evolve!")

Peter Tils (CEO of Central and Eastern Europe Region. utsche Bank AG) in conversation with Claudia Dome (Research Fellow at the Fraunhofer Center Leipzig)

PROFILE OF THE LEIPZIG FRAUNHOFER CENTER

The Board of Trustees of the Leipzig Fraunhofer Center

The Board of Trustees has served as an important advisory body to the Fraunhofer Center for International Management and Knowledge Economy since 2013. The trustees provide constructive input into the Center's activities and also play a key role in establishing links between the institute and actors from industry, business, society and the political sphere.

composed of outside experts from the research community, the economic sector and public sector institutions. Dr. Wilhelm Krull, Secretary General of the Volkswagen Foundation, was elected as the Chairman of the Board by its members.

In April 2013, Fraunhofer Center Leipzig Telekom AG; Peter Tils, CEO of Central appointed a distinguished Board of Trustees & Eastern Europe Region, Deutsche Bank AG; and Bruno **Wenn**, CEO of Deutsche Investitions- und Entwicklungsgesellschaft (DEG).

Annual meeting

Members of the **Board of Trustees**

Also on the Board of Trustees are: Dr. Johannes Beermann, Member of the Board of the Deutsche Bundesbank and former Minister of State for Federal and European Affairs and Chief of the State Chancellery of the Free State of Saxony; Dr. Michael Brandkamp, Managing Director of High-Tech Gründerfonds Management GmbH; Jürgen Chrobog, former Chairman of the Board of BMW Foundation Herbert Quandt and former State Secretary of the German Federal Foreign Office; Dr. Peter Claussen, Owner and Managing Director of the systemic consultancy evolve!; Arndt-Günter Kirchhoff, Managing Partner of the Kirchhoff Group Iserlohn and CEO of Kirchhoff Holding GmbH & Co.; Dr. Walter Mönig, Chairman of the Board of Governors of the Joint Research Center of the European Union; Peter Nothnagel, Managing Director of Wirtschaftsförderung Sachsen GmbH; Thomas Sattelberger, former Chief Human Resources Officer at Deutsche

The Board of Trustees meets once per annum to discuss the current activities and development prospects of the institute. The 2015 meeting, which took place in early April, focused on the realignment of the Leipzig Fraunhofer Center, the opportunities and challenges of digitization for businesses, and the institutional structures linking the business and research sectors.

The members of the Board of Trustees (left to right) and Institute Director Professor Thorsten Posselt (second from right) at their third meeting in Leipzig: Dr. Peter Claussen, Peter Nothnagel, Peter Tils, Thomas Sattelberger, Dr. Walter Mönig, Dr. Wilheln Krull, Bruno Wenn, Prof. Alfred Gossner (membe of Fraunhofer-Gesellschaft Executive Board) and ner former State Secretary Jürgen Chrobog



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The Board of Trustees serves the institute as an advisory body of outside experts. Its members are appointed on a consensual basis by the Executive Board of the Fraunhofer-Gesellschaft and the Institute Director for a three-year term



The institute in figures **•**

Developments in ongoing projects

Developments in staffing levels







2,85 Mio. in external revenues (in Euros) of which: 1,15 million came from international clients (40 %)

1,71 million came from national clients (60 %)



108 employees of which: 44 paid according to civil service pay scale (TVöD) (40%)

64 SHK/WHK/students (60%)

Revenues of the Leipzig Fraunhofer Center



2008	2009	2010	2011	2012	2013	2014
42,1	53,2	52,1	105,9	701,2	541,8	515,2
217,5	737,4	1022,3	1121,6	841,7	1522,7	2336,3
259.7	790.5	1.074.4	1.227.5	1.543.0	2.064.6	2.851.5

industry revenue in € thousand
 public revenue in € thousand

Timeline: history of the institute, 2006–2015

2006	2008	2011	2012
Fraunhofer Central and Eastern Europe (MOEZ) established in Leipzig	Prof. Thorsten Posselt appoin- ted Institute Director	Scope of research pro- jects expanded beyond Central and Eastern Europe	Successf evaluate Fraunho Gesellsc

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Increase in sales compared to 2013

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2013

Distinguished Board of Trustees appointed for the Institute

ISO certification in accordance with DIN standard ISO 9001 for quality management

2014

Institute realigned under new name Fraunhofer Center for International Management and Knowledge Economy

Big Data Center opened at institute with more than 220 processor cores and some 450 terabytes of storage capacity

Certified processes ensure lasting quality

The Leipzig Fraunhofer Center is committed to excellence in its research work, something which was confirmed in early 2013 when it was successfully certified according to quality management standard DIN EN ISO 9001:2008.

The need for certification in accordance with an internationally recognized quality standard was first identified in 2010 against a backdrop of ever increasing client requirements and a Center embarked upon the auditing desire to achieve greater transparency in research activities. To this end, the Leipzig Fraunhofer Center drew on the expertise of its staff to develop a extremely positive, culminating in the systematic quality management system (QMS) and readied it for certification by the end of 2012.

"The company's quality manage- ments of certification, ment system should be reviewed and certified on a standardized basis."

Udo Hansen, President, Deutsche Gesellschaft für Qualität e.V. (DGQ e.V.)

Certification by **Germanischer Lloyd**

In April 2013, the Leipzig Fraunhofer process together with auditors from globally recognized certification company Germanischer Lloyd. The audit was institute receiving certification according to guality standard DIN EN ISO 9001:2008, a highly regarded international quality seal.

> As part of the requirethe Leipzig Fraunhofer Center team underwent the necessary monitoring audit and internal audit in 2014, which were also concluded extremely successfully.



ntact: dreas Scholz **Ouality Manage** andreas.scholz@moez.fraunhofer.de +49 341 231039-120

PROFILE OF THE LEIPZIG FRAUNHOFER CENTER

Leipzig as a center of research and education

Dense network of research institutions and universities

Boasting a 600-year-old traditional university, eight other universities and over 20 non-university research institutions, Leipzig is an attractive location for study and research. For centuries, this long established Center of commerce and exhibition has supported transfer and dialogue processes, a trend that is also reflected in the close cooperation between knowledge Centers, universities, the city council and businesses.

The Leipzig Fraunhofer Center cooperation partner in the region

As one of two Fraunhofer institutes in Leipzig, the Fraunhofer Center for International Management and Knowledge Economy has been engaging in high-guality, research-based dialogue with Leipzig University since it was founded in 2006, not least through the teaching activities of its staff there.

In order to exploit synergies, collaboration between academic and industrial research plays an important role. The Fraunhofer institutes are closely linked through cooperation agreements with universities, with institute heads often occupying simultaneous posts as university professors. Other Fraunhofer executives also maintain positions within the landscape of higher education. This is the case at the Fraunhofer Center for International Management and Knowledge Economy in Leipzig as well, where Institute Director, Prof. Dr. Thorsten Posselt is also Chair of Innovation Management and Innovation Economics within the Faculty of Economics at the University of Leipzig. Also teaching at the university are Steffen Preissler, Head of the Knowledge and Technology Transfer division and Dr. Nizar Abdelkafi, head of the Business Models: Engineering and Innovation unit.

Starting August 1st, 2015, Prof. Dr. Utz Dornberger took over leadership of the Entrepreneurship and Innovation for Development Cooperation unit in the Leipzig Fraunhofer Center's Knowledge and Technology Transfer division. Since 2004 Professor Dornberger has also been the Director in charge of the International SEPT Program (SEPT – Small Enterprise Promotion and Training) at the University of Leipzig, where he is a Professor of Development Economics, focusing in particular on small and medium enterprise development.



ISO 9001 is the most significant and widely used standard in the field of quality management. It sets out the minimu requirements that an organization's QMS must meet in order for the organization to be able to manufacture goods and provide services that meet customers' expectations and comply with official requirements, where applicable. Certification is possible for organizations and companies of all sizes and in all industries.



ANNUAL REPORT 2014/15

Prof. Dr. Thomas Bruckner, Head of the Sustainability and Management and Infrastructure Economics division, is responsible for research into the energy industry at the Fraunhofer Center in Leipzig. Since 2008 he has held the Vattenfall Europe Chair of Energy Management and Sustainability at the University of Leipzig's Economics Faculty and he has been Managing Director of the university's Institute for Infrastructure and Resources Management since 2009. In 2014, Prof. Dr. Bruckner was appointed spokesman for the university's newly created research profile line "Sustainable Systems and Biodiversity".

On August 1st, 2015, JProf. Dr. Tobias Dauth assumed leadership of the Entering New Markets and Regional Positioning and Location Development units at the Fraunhofer Center for International Management and Knowledge Economy. In April 2013, Dr. Dauth accepted an appointment at the HHL Leipzig Graduate School of Management where he has been training under the Alfried Krupp von Bohlen Junior Professorship in International Management.

Fraunhofer-Gesellschaft

Research of practical utility lies at the heart of all activities pursued by the Fraunhofer-Gesellschaft. Founded in 1949, the research organization undertakes applied research that drives economic development and serves the wider benefit of society. Its services are solicited by customers and contractual partners in industry, the service sector and public administration.

At present, the Fraunhofer-Gesellschaft maintains 66 institutes and research units. The majority of the nearly 24,000 staff are qualified scientists and engineers, who work with an annual research budget of more than 2 billion euros. Of this sum, around 1.7 billion euros is generated through contract research. More than 70 percent of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. Almost 30 percent is contributed by the German federal and state governments in the form of base funding, enabling the institutes to work ahead on solutions to problems that will not become acutely relevant to industry and society until five to ten years from now.

International collaborations with excellent research partners and innovative companies around the world ensure direct access to regions of the greatest importance to present and future scientific progress and economic development. With its clearly defined mission of application-oriented research and its focus on key technologies of relevance to the future, the Fraunhofer-Gesellschaft plays a prominent role in the German and European innovation process. Applied research has a spin off effect that extends beyond the direct benefits perceived by the customer: Through their research and development work, the Fraunhofer institutes help to reinforce the competitive strength of the economy in their local region, and throughout Germany and Europe. They do so by promoting innovation, strengthening the technological base, improving the acceptance of new technologies, and helping to train the urgently needed future generation of scientists and engineers.

As an employer, the Fraunhofer-Gesellschaft offers its staff the opportunity to develop the professional and personal skills that will allow them to take up positions of responsibility within their institute, at universities, in industry and in society. Students who choose to work on projects at the Fraunhofer Institutes have excellent prospects of starting and developing a career in industry by virtue of the practical training and experience they have acquired.

The Fraunhofer-Gesellschaft is a recognized non-profit organization that takes its name from Joseph von Fraunhofer (1787–1826), the illustrious Munich researcher, inventor and entrepreneur.

www.fraunhofer.de/en





Corporate Development in International Competition

Knowledge and Technology Transfer∎

Sustainability Management and Infrastructure Economics





Corporate Development in International Competition

The experts in the business area **Corporate Development in International Competition** at Fraunhofer Center Leipzig are strategic partners of German and European companies working in internationalized markets.

The business-driven market services grouped in this working area have been developed for companies that have to cope with particular demands as part of internationalization processes.

The Fraunhofer specialists in this working area use their expertise to support companies in

- entering new markets,
- selecting and developing suitable sites,
- assimilating knowledge and ideas and incorporating them into the company,
- implementing new products and services and
- developing the staff required for this.



We understand how to unlock and develop new markets

Prof. Dr. Thorsten Posselt

Institute Director

Head of Division, Corporate Development in International Competition

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CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

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ANNUAL REPORT 2014/15









Entering New Markets

Our field is new venture management. We support companies in conducting flagship Since August 1st led by: projects that aim to significantly increase their competitiveness.

We specialize in the development of international markets and the management of innovations, particularly for technology-oriented medium-sized enterprises.

Market development strategies and market development concepts

- Technology adaption
- Selecting and assessing locations
- IP management

Business Models: Engineering and Innovation

Research-based support in designing, improving and assisting the implementation Led by: of new business models forms the key service we offer to our customers in business Dr. Nizar Abdelkafi and industry.

Head of Unit Business Models:

JProf. Dr. Tobias Dauth

Head of Units Entering New

Markets, Regional Position and Location Development

ngineering and Innovatio

Fraunhofer Center Leipzig has developed tools that support companies in identifying an advantageous market position. The toolbox enables companies to systematically develop, analyze and continuously improve business models. The tools meet scientific standards and are tried and tested.

The added value for the customer lies in being able to achieve higher profitability for the long term.

- Business model engineering and standardization
- Strategic positioning and business model audits
- Business model innovations

Price and Service Management

We support companies with the challenges of price and service management on Led by: the basis of established and innovative approaches from applied research. We have Dr. Marija Radić the knowledge and the tools needed to raise the potential of companies in the areas Head of Unit Price and of revenue and price modelling and servitization - the transformation from producer to service-oriented solutions provider.

ervice Management

Marketing products and services – irrespective of whether they are innovative or already established on the market – means finding the optimum price and revenue model and supremely mastering the management of prices. As the pivotal driver of revenues, prices have a direct effect on profit. They determine the sustainability of companies and corporate success.

For providers, global competition increases the pricing pressure and the pressure to differentiate. Here companies are discovering the subject of "servitization" - the transformation from producer to service-oriented solutions provider. The necessary high-quality service portfolio places great demands on the development and management competencies of the companies that we support in development and quality management.

- Developing innovative revenue models
- Price and product optimization
- Development and quality management of services

CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

Professional Development and Competence Management

For internationally operating medium-sized enterprises and corporate groups, the human factor is increasingly becoming the one that distinguishes them from their competitors. It is also a driver for innovation and competitiveness. Besides machines and equipment, intellectual property rights and data, in the future the competencies of companies, whether at the staff level or the level of company organization, will become their most significant resource. We support companies for which strategic and professional development and competence management can contribute towards creating solutions for sustainable corporate success.

Change processes such as internationalization, digitalization and demographic change call for constant adaptations. For companies, this is the path to becoming a learning organization. We support the companies along this path in developing and implementing skills (management) models with the latest findings from applied research

- Designing and implementing skills management models
- "Humane Human Resource Management" (staff recruitment, staff development and staff planning, work-life-balance, preventive work and health management, diversity management, culture-specific Human Resource Management)
- Managing learning processes

Regional Positioning and Location Development

We help regional funding to develop and implement modern positioning strategies. Our specializations are location benchmarking, identifying investor source markets and the management of regional stakeholder networks.

- Location Benchmarking and Development
- Employer Branding at new locations
- Regional Branding

Led by:

Anzhela Preissler

Head of Unit Professional Competence Managemen



Since August 1st led by:

JProf. Dr. Tobias Dauth

Head of Units Entering New Markets, Regional Positi and Location Developm



Viiav Gokhale (Ambassador of India to Germany) invites guests to forge links with India's economy.

(Itr) Some 70 participants took part in the first German-Indian Ec orum in Leipzig. The presentation focused on knowledge exch tworking, in particular for small and medium size enterprises. Po er Center Leipzig), Joerg Uehlin (European Business and Technolog Center (EBTC)), Vijay Gokhale (Ambassador of India to Germany).

"I'd like to express my sincere thanks for this exceptionally well-organised, exciting and inspiring event; I thought it was a resounding success! I'm convinced that it will spawn many great initiatives; you couldn't help but feel the all-round enthusiasm."

Christiane v. Krshiwoblozki, Administration Executive, Larsen & Toubro Infotech GmbH, Leipzig

CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

From cultural dialogue to technology adaptation - the roadmap for the first German-Indian **Economic Forum**

The first German-Indian Economic Forum in Leipzig provided an opportunity for SMEs to learn about the potential and challenges of the Indian market.

"Make in India", the international campaign launched by Indian Prime Minister Narendra Modi in 2014, aims at bringing more foreign investment to the Indian sub-continent, especially in the field of manufacturing.

This was reason enough for experts from the Fraunhofer Center and the German-Indian Round Table (GIRT) in Leipzig to host the first German-Indian Economic Forum on the Mediencampus Villa Ida. The one-day event offered an opportunity for 100 participants from SMEs, as well as consultants, to obtain information about the opportunities and challenges involved in launching German products on the Indian market. Having been personally invited to the German-Indian Economic Forum by the Indian Ambassador to Germany, entrepreneurs had an opportunity to engage in in-depth dialogue on their experience of the economic challenges in India, whether as part of the panel discussion on the sub-continent's current political and economic situation or during one of three panels on the topics of "Taxes, law and finance", "Entrepreneurial experience" and "Transfer and innovation" respectively.

The forum quickly developed into a platform for establishing valuable contacts with service providers and companies with Indian market experience.

<u>iration:</u> 12/2014 – 4/2015, formation session 21st April 2015, liencampus Villa Ida, Leipzig

pean Business and Technol w Dehli, Landesbank Baden-KPMG, Dorschner & Hoffma

chaftsförderung Sachsen GmbH, Dresden, IHK Halle-Dessau, IHK Chemnitz, Gera, ZAB Brandenburg, LEG Thüringen, IMG hsen-Anhalt, Germany Trade & Invest

<u>am:</u> Hans-Günter Lind, Michael Benz, Karl Gürges, ndra Lewandowska, Nico Pohlenz



Contact: Hans-Günter Lind Until 15.8.2015 Head of the Units Entering New Markets and Regional Positioning and



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any is India's most important trading partner in the European Union. A trade surplus of 3,4 billion Euro (2012/13) demonstrates the gh acceptance of German products



FRAUNHOFER CENTER FOR INTERNATIONAL MANAGEMENT AND KNOWLEDGE ECONOMY



on potential serves as th basis for innovative ideas, as illustra and by this standardization idea tree

"A standard is like a backbone, an absolute necessity in order to be innovative. Clearly it is the basis (for our product development)."

(Interviewee from the mechanical engineering sector)

CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

Innovation and standardization in enterprises

Innovation and standardization are not mutually exclusive. The use and development of standards might open up new opportunities for the innovation potential of small and mediumsized enterprises (SMEs) and involvement in their development has been barely exploited to date.

Published in late 2014, the paper entitled "Seizing Opportunities for the Support of Innovation through Committee Standards and Standardization: Insights from German Companies" is based on the findings of the "Innovation capability of standarization" (IPONORM) project. This project aimed to investigate the relationship between innovation and standardization in SMEs. The research builds upon findings from 40 semi-structured interviews conducted with experts from German companies in five sectors: biotechnology, nanotechnology, services, security and mechanical engineering. The key interviewees are practitioners with Research and Development (R&D) and standardization experience.

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8-02 for naner sizes such as A4

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refers to opportunities for the support of innovation through

N EN ISO 9001 for quality

A standard is a document that ects the state of the art in a

Recognizing the innovation potential in standardization

Abdelkafi and Makhotin evaluated the interviews by means of a qualitative content analysis. They found that there are many opportunities for innovation through the use and development of standards, but that this potential was not being intentionally exploited by the SMEs. Consequently, the



authors examined internal and external factors that influence the generation, identification and activation of innovation potential in standardization. They and derived specific recommendations for actions for SMEs wishing to benefit to a greater extent from standardization.

iration: 4/2012 -12/2013 al of IT Standards and ndardization Research, 12(2), 38-56, 7-12/2014

ent: German Institute for Standardization (DIN)

g: The "Innovation potential of standardization M) project is being funded as part of the ation with Norms and Standards" (INS) initiative inich is being implemented by the German Federal inistry for Economic Affairs and Energy (BMWi) ised on a decision by the German Bundestag.



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für Wirtschaft und Energie

Intelligent process control – launch of European technology project DISIRE

DISIRE-Distributed In-Situ Sensors Integrated into Raw Material and Energy Feedstock

The European technology project DISIRE aims to set new standards in energy efficiency for chemical, steel and mineral processing and for combustion processes.

The EU project "Distributed In-Situ Sensors Integrated into Raw Material and Energy Feedstock" (DISIRE) was officially launched in Brussels on January 28th, 2015. Top researchers and world leading industrial players involved in DISIRE will develop robust, yet miniaturized in-situ PAT sensors over the next 36 months. These process analysis technologies will provide real-time insights into dynamic processes. DISIRE researchers now intend to integrate the sensors in miniature into raw material flows. The acquired in-situ data will be compiled in a cloud for analysis, making it possible to control processes in real time to reduce energy consumption and increase process efficiency. This goes some way towards making the concept of "intelligent raw materials" a reality and opens up new opportunities for commercial applications and cross-sectoral business scenarios in European industry. Funded under the EU Horizon 2020 framework, SPIRE PPP, the DISIRE project pools the expertise of 15 research and industry partners from Sweden, Spain, Italy, Germany, Poland and Israel.

aunch date: January 1st, 2015 Junding: EUR 6 million

Funding: The DISIRE project is funded under the EU Horizon 2020 framework under Sustainable Process ndustry Through Resource and Energy Efficiency (SPIRE

rtners: ABB AGResearch Center for Energy Resources otion, KGHM CUPRUM, D'Appolonia, Dow érica, Electrotech AB, Fraunhofer Center istat SA, IMT Institute for Advanced Studies GHM Polska Miedź SA, Luossavaara-Kiirunavaara ktiebolag AB, Luleå University of Technology, MEFOS, DYS S.r.l., Wrocław University of Technology

<u>eam:</u> JProf. Dr. Tobias Dauth, Eleonora Zagorska, evheniya Kralyuk, Stiliyan Stoyanov







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CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

Street lights: charging stations for electric cars

Light source for the streets, energy supply for electric vehicles: The street lights in Leipzig city center offer a good alternative for drivers of electric vehicles when it comes to charging their batteries. From street light straight to your car research has been carried out into a business model that expands the urban energy supply and promotes electric mobility in Leipzig.

have no parking space of their own where they can charge their vehicle. In Leipzig, street lights may soon provide the solution. Under the German government's electromobility showcase program, a viable business model for a public electric-vehicle charging infrastructure is to be developed in Leipzig, based on using street lights fitted with charging units. Researchers from the Fraunhofer Center for International Management and Knowledge Economy carried out a study in this area, using the Delphi method to obtain opinions from experts in successive written surveys to identify a consensus. About 80 interviews with experts revealed trends and scenarios that were validated by the project team and further developed into a business model for Stadtwerke Leipzig (public utility). In the future, this local energy provider is set to offer a conductive, that is cable-based, charging service for electric cars at city center street lights in Leipzig. The "Business Models: Engineering and Innovation" Unit of the Leipzig Fraunhofer

Urban dwellers with electric cars often Center will continue its research-based support of Stadtwerke Leipzig will during the implementation of the developed business model.

ration: 12/2012 – 11/2015

nding: In 2012 Federal Government initialized the wcase electro mobility program which is spread ween the Federal Ministry for Business and rrgy (BMWi), the Federal Ministry for Education Research (BMBE), and the Federal Ministry for on and Digital Infrastructure, as well as Federal Ministry for the Environment, Nature nservation, and Nuclear Safety (BMUB).

<u>artners:</u> Stadtwerke Leipzig, Iniversity of Leipzig, HTWK Leipzig <u>eam:</u> Dr. Nizar Abdelkafi, Stefan Wappler, ergiy Makhotin, Stephan Melchert









Contact: Dr. Nizar Abdelkafi Head of Unit Business Modeling:

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Electric vehicles are charged ductively from the street light. Conductive charging refers to charging using a physica connection, such as a cable or current collector. Inductive charg involves charging without the use of a physical connection.











"I learned a lot through this experience, whether in terms of scientific knowledge and methodology or German culture. It was very insightful and rewarding to work in an institute such as Fraunhofer Center Leipzig, where I was able to discuss issues with colleagues and share opinions and ideas with them. Besides the institute itself, Leipzig is a really lovely city."

Aida, Boukhris – student in first year group/on the DICAMP Master Program. For her master's thesis, she researched the topic of "Business Model Innovation – A Support for High Growth" at Fraunhofer Center Leipzig.

CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

Pooling experience, creating innovation – the DICAMP Master **Program in Tunisia**

Researchers from the Leipzig Fraunhofer Center are working with international partners to develop an accredited and cross-institutional master's degree program in innovation management in Tunisia.

Working with German, British, French and Tunisian partners, the Fraunhofer Center for International Management and Knowledge Economy has developed and implemented an accredited cross-institutional master's degree program in Innovation Management in Tunisia. The program was launched two years ago for the first 30 students at the three partner universities in Tunis. In order to promote cross-border, interdisciplinary networking, researchers from the Fraunhofer Center Leipzig also designed an innovation lab, which they implemented in Tunisia in cooperation with the École Nationale d'Ingénieurs de Tunis (ENIT). This virtual lab has been set up to run innovation contests between Tunisian and European students and to promote intercultural dialogue. The Business Models: Engineering and Innovation unit is also responsible for designing individual modules of the master's program, such as seminars on leveraging potential for innovation and the strategic use of this potential, or on managing collective knowledge.

During the program, six Tunisian graduates took the opportunity to combine their project work and master's theses with a research placement at the Fraunhofer Center for International Management and Knowledge Economy in Leipzig.

uration: 9/2011 – 4/2015

iversity of Leipzig, Leipzig Graduate Schoo lied Sciences (HSWT), University of de Tunis (ENIT), École Superierue des

elop ideas. (Bullinger, Möslein 2010: 2).



Funding: European Union, as part of the Tempus program

ource: Bullinger & Moeslein (2010): Innovation Contest Where are we?, AMCICS Proceedings, Paper 28, p. 2



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Strategy workshop of C3 consortium at the Model of carbon concrete composite bridge.

CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

Combining efficiency and aesthetics: paradigm shift with carbon concrete composite

Construction processes are set to become more efficient and sustainable, something made possible by the use of new building materials such as carbon instead of steel. This is the goal of the "C3 – Carbon Concrete Composite" project. Researchers from the Leipzig Fraunhofer Center are investigating the extent to which carbon concrete composite can be used as an alternative to steel reinforced concrete.

Carbon concrete composite is a new, multifunctional material that is highly durable yet can also be formed into any shape. As a result, it makes projects particularly resource efficient in terms of raw material use, can be used to build flexible structures with a long lifespan, and can also be employed as a construction material in integrated heating systems. Carbon concrete composite is set to revolutionize the construction industry and make new-builds and maintenance processes for existing buildings more cost-effective, efficient and environmentally friendly. To this end, Fraunhofer Center Leipzig researchers from the Unit "Business Models: Engineering and Innovation" are conducting studies as part of a nationwide alliance of 130 partners from the fields business, academia and industry associations. Under the umbrella of the "C³ - Carbon Concrete Composite" project, they began by producing a study of the construction market and neighboring sectors in 2014. Based on expert interviews, workshops and desk research, this study contains a detailed analysis of the German market and competition landscape and identifies relevant markets and market segments for C³.

Bundesministerium für Bildung und Forschung



Duration: 6/2014 - 11/2014

<u>lient:</u> C³ – Carbon Concrete omposite e.V., Dresden

> ing/Partners: German ral Ministry of Education tesearch (BMBF) / Twenty20 mership for Innovation

<u>eam:</u> Dr. Marija Radić, Dr. Nizar bdelkafi, Stefan Wappler, omy Hilbig, Caroline Große

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is carbon composite can be nstead of steel as a reinforcing ial, allowing the construction ch thinner and more nlined structures that save ources. Because the material is formed into any shape, it takes it easier to use nonigular shapes, enabling the uction of more aesthetically sticated structures.

> carbon concrete

composite



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Often, the physical, psychological and social pressures upon people who care for relatives suffering from dementia are high. Relief facilities, such as the Night Café remedy can be of great assistance. www.gerinet-leipzig.de



"Innovative services within the health care sector have to be demonstrably cost-effective. Partnering and working closely with the Fraunhofer Center has enabled us to develop a structured, customer-centric and economically sustainable service design for the Night Café."

(Lysann Kasprick, Project Manager, GeriNet Leipzig)

Innovative services for people with dementia

The GeriNet Night Café in Leipzig provides support to dementia sufferers and their relatives. Researchers of the Fraunhofer Center developed a model for an economically sustainable service.

Recognizing the potential for innovation

Many people suffering from dementia get mixed up in their day and night routines, which can put a significant strain on relatives who care for them. The GeriNet Night Café was set up in the Leipzig region to address this issue by providing care to sleepless patients. Working with this Leipzig-based network, the Fraunhofer Center used a research approach to improve the viability of this business model. Using findings from service-provision research, the "Price and Service Management" Unit developed a customer-centric process design and simulated the different options in terms of cost-effectiveness.

Since autumn 2013, dementia sufferers have been able to receive night-time care at the facilities of the German Red Cross (DRK) in Leipzig. The Night Café aims to help patients get back into a normal day and night routine, delay their entry into care homes and prevent them from ending up in hospital.

Duration: 9/2014 - 8/2015

Client: GeriNet Leipzig

<u>Funding:</u> German Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ), "Local Alliances for People with Dementia" program <u>Team:</u> Dr. Marija Radić, Caroline Große, Marie-Louis Hohloch







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Service design refers to the process of using scientific research methods to design services. This is usually

to design services. This is usually carried out in close cooperation with the enterprises concerned in order to ensure that the design meets customer and market requirements.









(Itr) MinR Christian Stertz (Federal Ministry of Education and Research), Karlheinz Faller (Training and Development Centers for Bavarian Industry (bfz) gGmbH), Prof. Dr. Thorsten Posselt (Fraunhofer Center Leipzig), Dr. Ulrich Eimer (Moderator), Dr. Monika Stricker (bfw –Companies for Education), Ludger Thomas (VDZ gGmbH).

The Leipzig Fraunhofer Center team, at the third Congress for Vocational Training Export in 2014.



Export hit: vocational training

Whether as a prerequisite for exporting equipment or as a product in its own right, training provision is a booming business. Fraunhofer Center Leipzig researchers are placing it on a strategic footing and developing customized export handbooks.

The export of vocational training has become a key industry globally. Providers in Germany also benefit from the high demand for well-qualified professionals that is associated with the export of complex, hi-tech equipment, for example, in the field of mechanical engineering. Consequently, the German Federal Ministry of Education and Research (BMBF) has made the export of vocational training by German educational service providers a funding priority, working since 2008 to support collaborative projects that develop solutions to overcome export barriers and boost success factors.

Fraunhofer Center Leipzig advised the funding initiative from 2012 to 2014, conducting a meta project to examine ways of assisting with the work of these programs through supporting analyses and by kick-starting academic and methodical learning processes through dialogue. As a result, the Fraunhofer Center Leipzig team helped to encourage networking among German vocational training providers and further develop BMBF's funding priority for the export of vocational training by German providers.





Bundesministe für Bildung

und Forschund



Duration: 11/2012 - 10/2014

Client: The German Aerospace Center

<u>nding/Partner:</u> Federal Ministry r Education and Research (BMBF)

n: Prof. Dr. Thorsten Posselt, iandra Dijk, Dr. Nizar Abdelkafi Maria Radić, Hans-Günter Lind, hela Preissler, Steffen Preissler, Isandra Lewandowska, iael Bernik, Robert Liebtrau, Jdo Dietze, Romy Hilbig, anie Josephine Irrler





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Dr. Daniel Boese, since April 2014 Senior Vice President of the Festo Gruppe, Leader of Business Unit Didactic and Managing Director of the subsidiary Festo Didactic GmbH & Co.KG.

Impressions from the Third Congress for Vocational Training Export in Berlin, October 2014.

CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION _____

Guidelines for vocational training exportation

The meta project has produced nine sets of guidelines with concrete instruments and checklists for specific topics of vocational training exportation. These guidelines offer structured information prepared according to uniform standards, providing valuable pointers for the development of export projects and viable business models. They have even become a valuable acquisition instrument. The underlying data was collected by Fraunhofer Center Leipzig researchers during the meta project or taken from the research findings and experience of past projects.





Here you can dow the action guidelines for Vocational Training Export.

The Fraunhofer Center Leipzig researchers were also tasked with organizing and facilitating learning and dialogue processes. Over the course of the project, Fraunhofer Center Leipzig engaged in dialogue with different actors in the field of German vocational training exports, and designed and organized three specialist congresses and a communications strategy. The strategy contains a detailed schedule with checklists, a communications concept and the program for organizing and implementing the congress and its content. The findings and the acquired contact data are set to be used in major events relating to vocational training exportation going forward.



Regional Branding – making regions more attractive

Researchers of the Fraunhofer Center develop solutions for creating a welcoming environment that encourages people to stay in a region in order to meet long-term demand for professionals against the backdrop of demographic change.

Working in the Prignitz region?

This is not an option for many young professionals. Like other regions located outside of urban centers, Prignitz in Brandenburg holds little appeal to urban dwellers, which in some cases has serious consequences for the regional economy. Researchers of the Fraunhofer Center are now pooling ideas and initiatives aimed at making their region more attractive. The aim is then to work with the network of stakeholders from politics, business and society to identify common features of their individual initiatives to enable them to present a consistent image of their region. This successive approach allows the employment and corporate landscape of a region to be adapted to that region's expected economic development in the medium and long term.

Duration: 8/2014 – 4/2015 Clients: Regional administrations, business developcies, administrative districts

Partners: HHL Leipzig Graduate School of Management, Monster Worldwide Deutschland GmbH





Regional Branding eloped by the Fraunhofer nt, regional brand cept for making a regio



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CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

Training program for Polish research managers

The last few years have seen the European Union invest a total of EUR 5 billion in Poland's research infrastructure, enabling numerous research institutions to set up new laboratories and bring existing ones into alignment with international standards.

Fraunhofer researchers developed a program to train the specialist staff at these institutions in how to develop and manage this state-of-the-art research infrastructure.

Poland's National Center for Research Corporation (IBM) supplemented the expeand Development (NCBR) launched the "SIMS - Science Infrastructure Management Support" project in 2013 to train 120 research managers from innovative Polish research institutions, laboratories and university departments.

Leipzig Fraunhofer Center delivers training in research management

Fraunhofer researchers developed and delivered a two-week training program focused on sustainable learning. Practiceoriented presentations and workshops enabled participants to learn about strategy development, research marketing, application strategies, IP management, technology transfer, effective cooperation with industry, fundraising, HR management, legal issues in research management, and infrastructure management.



the training.



ANNUAL REPORT 2014/15

Having gained an insight into German research institutions and companies, the managers of the Polish institutes then traveled to the United States. Project partner International Business Machines rience gained by the managers in Germany with information and expertise from U.S. research infrastructure. Participants were unanimous in their positive assessment of

Duration: 11/2013 - 11/2014 <u>Client:</u> National Center for Research and Development (NCBR)

ng/Partner: International Business Machine pration (IBM), Technical University Dresden

n: Anzhela Preissler, Woiciech Roskiewicz r. Udo Dietze, Malgorzata Krowicka, Michal Turo laria Krukowska, Julian Kehrer



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Handbook for EU structural fund beneficiaries – transition towards more applied research

Researchers of the Fraunhofer Center in Leipzig have published a practical handbook on applied research, which, in addition to best practice modules, offers tools and strategies for developing a modern research culture.

"Best Practice and Practical Guidance on Undertaking and Managing Applied Research" is the title of the handbook, which has been published on behalf of the European Investment Bank (EIB) by the Professional Development and Competence Management unit at Fraunhofer Center Leipzig. The tools and strategies developed by the Fraunhofer researchers assist research institutions and small and medium-sized industrial enterprises in gradually introducing market-pull and technology-push research practices. The innovative findings of this work provide public research institutions and the industrial sector with a solid foundation for growth.

The handbook describes methods

for developing principles and processes for a well-functioning research culture;

for the transformation to applied research:

- for sustainable knowledge management;
- for the strategic planning, initiation and maintenance of productive partnerships, and
- for networking between research institutions in the public sector.

The handbook also outlines potential obstacles and impediments that need to be taken into account when developing and implementing applied research approaches.

Duration: 9/2014 - 4/2015

Client: European Investment Bank

<u>Team:</u> Anzhela Preissler, Prof. Dr. Thorsten Posselt, Prof. Dr. Arno Basedow, Prof. Dr. Karol Kozak, Wojciech Roskiewicz, Jeanine Haack, Michal Turowicz



Contact: Anzhela Preissler Head of Unit Professional

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CORPORATE DEVELOPMENT IN INTERNATIONAL COMPETITION

Identifying and evaluating investor source markets and industries

Wirtschaftsförderung Region Leipzig GmbH seeks to attract companies to Leipzig and the districts of Leipzig and North Saxony and create jobs there. New companies and jobs increase the economic power of the region, make it more attractive for future investment and imbue it with additional vitality.

Leipzig Fraunhofer Center conducted a detailed study to identify and evaluate potential investor source markets and industries in the Leipzig region. In this context, investors source markets for investors are countries and regions that are home to companies interested in investing in Leipzig and North Saxony as part of their international corporate activities.

Potential investor source markets and industries are identified on the basis of different sub-analyses. The study examined foreign direct investment in Germany and the region. Additionally, interviews were conducted with regional industry experts, providing insights into the strengths and potential as well as the weaknesses and deficits of the main regional industries: the automotive and supply industry, health management and biotechnology, energy and environmental technology, logistics, IT, chemistry and plastics, and mechanical engineering. The complexity of the value chains, the potential of individual industries for attracting companies and the general conditions of specific industries in the region were also examined.

An industry analysis and an evaluation of the structure, trends and expansion potential of the industrial sectors of the manufacturing industry were carried out subsequently in the potential investor source markers and industries identified. The findings of the study ultimately pointed the way towards appropriate international investor source markets for Leipzig and the region, and will help in reaching out to specific potential investors and bringing them to the region.





<u>ontact:</u> drienne Melde Research Fellow Regional Position and Location Development Unit +49 341 231039-155

Duration: 12/2013 - 3/2014 Client: Wirtschaftsförderung









Location Benchmarking – How do you identify the right location?

Global systems and markets require entrepreneurs to hold their own among international competitors. In this context, the issue of finding the right location for production, research and development is crucial.

Choosing the right location for research, development and production has a major bearing on the expansion and internationalization activities of a company and, by extension, on its overall success.

Good infrastructure, access to suppliers and suitable financing instruments are very important in this regard. In addition, it is increasingly necessary to have suitable, well-qualified employees or links to existing networks and research activities locally.

This is why Fraunhofer Center Leipzig is helping firms to select a location. Researchers from the Regional Positioning and Location Development Unit create an n-dimensional requirements matrix based on a company's individual needs. This matrix is aligned with a range of databases available to the institute as part of a multi-step process. The company is presented with a shortlist of potential locations worldwide, which are then narrowed down in further dialogue with the client.

Duration: 1/2014 – 2/2015 Il electrical appliances essors of bamboo fibre, etc

<u>Team:</u> JProf. Dr. Tobias Dauth, Hans-Günter Lind, Martina

Since 1st August, 2015: Head of Units Entering New Markets, Regional Positionir and Location Development

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nit Regional Positioning and

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Less is more: the potential of frugal innovation

Germany is losing its competitive edge as a global leader in innovation due to new international methods of dividing labour and new markets for innovation that are developing in emerging economies.

The export strength of the German economy rests on products with high research and development content. These products have arisen as a result of, among other things, the specialization of industry and business in high-quality and, in many cases, tailor-made, products. This is all part and parcel of centuries-old traditions in German industrial culture. However, new middle classes in emerging economies such as China and India are looking for affordable, robust products that are adapted to their local contexts, rather than expensive products that are highly complex and, in some cases, have been over-engineered. The complex and far-reaching changes that these developments entail are challenging companies in Germany to re-think and redefine their established hi-tech, path-dependent innovation models. This is essential if they are to maintain and consolidate their leading role in global research and industrial structures in the long term.

German companies thus face a two-fold challenge: to cast off the established mindset of a traditionally technology-driven industrial culture and to find new and sustainable forms of innovation geared to the needs of emerging economies. This will enable them to avoid a further increase in the complexity of the value chains and performance of hi-tech products. The term "frugal innovation" is entering the vocabulary of Western corporate culture to describe the implementation of great ideas using modest resources. This approach could ensure that companies retain their international competitive edge. After all, necessity is the mother of invention.

Duration: 8/2015 - 7/2017 <u>Client:</u> Federal Ministry of Family, Senior Citizens, Women and Youth (BMFSFJ) ding/Partner: Institute for Technology and Innovat Management at Hamburg University of Technology Project partner: VDI/VDE Innovation + Technik GmbH <u>Team:</u> Prof. Dr. Posselt, JProf. Dauth, Eleonora Zagorska, Martina Hamingerova

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Casting aside old ways of thinking





nce 1st August, 2015: ad of Units Entering Nev rkets, Regional Position

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I services that are affordable d whose quality is suitable for eir purpose. It is geared toward



Innovation processes do not stop at national borders. They boost the international competitiveness of companies and regions. They facilitate sustainable growth and simultaneously contribute towards solving global problems.

Here, in close partnership with our public and private customers, we develop and implement sophisticated solutions that address the specific problems posed by **knowledge and technology transfer**.

The business area "Knowledge and Technology Transfer" focuses on the following four market segments:

- professionalization of transfer processes,
- innovation funding,
- competition and technology analysis and
- international innovation policies.



We convert the "raw material" of knowledge into practical applications for industry, institutions, regions and policies.

Steffen Preissler

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Head of Unit Professionalization of Transfer Processes

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Professionalization of Transfer Processes

We focus on processes that promote practical cooperation between the spheres of Led by: science/research, business and politics. Here we support research institutions, research networks and transfer companies in organizing their transfer activities professionally and we advise political decision-makers on issues related to public transfer funding and promotion. In collaborative projects we devise dialogue processes that are targeted towards effectively disseminating research findings to various stakeholders and towards conducting joint research and development activities. The increasing international division of labour along global innovation and utilization chains and the growing necessity for innovations in networks (innovation 4.0) presents companies, research institutions and regions with fundamental challenges. Our experts support you in creating solutions with the latest findings from applied research.

- Organization of knowledge and technology transfer services
- Processes, structures and stakeholders in public transfer funding
- Science communication and "participatory research"

Innovation Financing

We take on the neutral role of an "interpreter" between innovators and investors. Led by: International research and innovation projects with multipliers from the sectors of Dr. Robin Bürger finance, science/research and politics form a joint working framework to further Head of Unit Innovation Financing develop the transnational transfer of innovative financial instruments, particularly in the field of environmental innovations. It is thus possible to better supply promising innovation projects with funds.

We work for customers from finance, science/research and politics.

With this range of services, we enable innovators to save considerable time and costs in searching for perfectly suited regional and interregional investors. A scientifically substantiated comparison of the investment criteria relevant to the market forms the authoritative basis for our services. We plan, organize and participate in tailor-made events on the topic of innovation funding.

For investors we provide access to promising and scalable innovation projects. In this way they also achieve considerable savings in time and costs. The range of services of the market segment Innovation Funding is rounded off with participation in interactive event formats and access to the Fraunhofer network and to other (co-)investors.

- Implementation of funding strategies/instruments, particularly in the context of EU projects
- Analysis of perfectly suited funding options for innovators and international investors
- Further development and transnational transfer of innovative financial instruments, particularly in the field of environmental innovations

Steffen Preissler Head of Knowledge and Technology Transfer Division Head of Unit Professionalization

of Transfer Processe

Competitive Intelligence

Together with and for our private and public customers, we develop solutions Led by: for continuously monitoring and analyzing the competition. Constantly keeping an eye on the international competition and evaluating the current technological developments is a key to success for technology companies and research institutions. Our focus here is on technology analysis. On the basis of our Book of Competitors platform, we develop tailor-made, interactive and constantly updated applications. The right recipients in the company are thus provided with the latest findings in an ongoing process so as to be able to make the right decisions. Customer-specific data and innovative analysis methods can easily be incorporated, which we combine with the Fraunhofer know-how on technologies, markets and regions. In this process, data protection has top priority for us.

- Customized solutions for continuous competition monitoring
- Finding and assessing global competitors and experts
- Analysis of fields of technology

Entrepreneurship and Innovation for **Development Cooperation**

We focus on innovation-policy issues in transnational cooperation. The economic and political changes in the world require constant adjustments to Germany and Europe's international cooperation. Here our analyses and recommendations for action examine the transnational innovation processes and from this derive information for initiatives in international innovation policy regarding the design, instruments, time and action planning, introduction and implementation and, finally, the measurement of the results of these initiatives. In this way, we support political decision-makers and organizers of international partnerships in a concrete way with the excellence of our experts.

JProf. Dr. Lutz Maicher

Head of Unit Competitive telliaence

Junior Professor for Technology Transfer at Friedrich Schiller niversity of Jena

Led by:

Prof. Dr. Utz Dornberger

Head of Unit Entrepreneurship and Innovation fo **Development Cooperation**



EU-MEX INNOVA

EUROPEAN UNION - MEXICO BILATERAL INNOVATION INITIATIVE





KNOWLEDGE AND TECHNOLOGY TRANSFER

EU-MEX INNOVA-**Transatlantic bridges for research** and development

The EU-MEX INNOVA project is supporting Mexico in internationalizing its research landscape and in networking with European partners.

Mexico sees cooperation with Europe as Horizon 2020. The initiative is designed a key element in its strategy for sustainable and inclusive growth.

2020, the European Union – Mexico Bilateral Innovation Initiative (EU-MEX INNOVA) seeks to foster cooperation in R&D between the European Union (EU) and Mexico. The project sets up a sustainable, knowledge-based bilateral dialogue between the key players and stakeholders in order to facilitate public and private research projects, develop joint mechanisms and promote the use of EU and Mexican instruments as effective tools for developing partnerships in science, technology and innovation.

to strengthen and promote research and development cooperation between the EU and Mexico. To this end, the project Aligned with the goals of Horizon team is initiating a long-term, knowledge-based bilateral dialogue between key actors and stakeholders. This should facilitate research projects by public and private-sector actors and help to develop and advertise joint funding mechanisms for European-Mexican partnerships.

> Duration: 9/2013 - 8/2016 **Client:** European Commission

Funding/Partners: CONACYT (Consejo Nacional de Ciencia y Tecnología), FEI (France Expertise Internationale) MINECO (Ministerio de Economía y Competitividad España), MADRIMASD (La Fundación para el Conocimiento madrid), Agency for the Promotion of European Research (APRE), OSEO/BPI France, COPARMEX ración Patronal de la República Mexicana)

With its expertise in internationalizing R&D and building innovation capacity, the Fraunhofer Center Leipzig is contributing a feasibility study on a joint international ST&I liaison office, a map of high potential European innovation players, a catalogue of best practices for promoting innovation and a pilot action plan to overcome innovation challenges.

The European Union - Mexico Bilateral Innovation Initiative, EU-MEX INNOVA, was launched to tie in with the EU Framework Program for Research and Innovation,

COPARMEX



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The bilateral project EU-MEX INNOVA (European Union - Mexico Bilateral Innovation Initiative) is facilitating more in-depth dialogue between European and Mexican actors in the field of research and development.



FRAUNHOFER CENTER FOR INTERNATIONAL MANAGEMENT AND KNOWLEDGE ECONOMY



The accelerapp team from the Leipzig Fraunhofer Center

"The experience, professionalism, knowledge and achievements of the Fraunhofer Institutes are widely known and need no recommendation. Nevertheless, we would like to highlight that we were positively surprised with all opportunities offered our company by Leipzig Fraunhofer Center. We want to draw everyone's attention to the incredibly flexible and fully tailored services that were made available to us. It allowed our company to fulfill our plans and initiate very fruitful cooperative relations in Germany."

Norbert Kowalkowski, CEO HTG High Technology Glass SA, Belmont-Lausanne, Switzerland

accelerapp – boosting marketability of innovations internationally

Developed by Leipzig Fraunhofer Center researchers, the accelerapp tool helps companies in identifying product adjustment needs, analyzing marketability chances and designing options for the further-development and market-transfer of their innovations.

Those wishing to tap international markets with new products need more than just stamina. Preparing, processing and managing international research projects and market launches also requires an enormous amount of time and financial and human resources resources. These are things which SMEs often lack because they are already working at full capacity to keep their day to day business activities running.

accelerapp supports companies in analyzing marketability

Consequently, Leipzig Fraunhofer Center researchers have worked with industry experts to develop the accelerapp methodology. accelerap is a tool that assists companies in identyfing needs and creating solutions with regard to R&D and commercialization processes abroad. Geared towards the management of international projects, this tool includes such convenient features as market validation and technology valuation. accelerapp develops, analyzes, tests and evaluates individual options for the further-development and transfer of innovations on global markets. Identified chances and barriers are illustrated using existing case studies. Finally, the tool derives potential development pathways for the company and its products. accelerapp has already been used successfully in projects with twelve international companies from different countries.

companies from the fields of: IT, Medicine, Production, Biotechnology and Life Sciences, Transport and Logistics, Safety, Finance, Energy

ic partners: Poland: National Center for Research and nt (NCBR), South Korea: Small and Medium ess Corporation (SBC) South Korea, IITP South Korea

Partners: Poland: Poznan Science and Tech

and Technology Park, Gdingen, South Korea: Chungbuk National Technology Park Team: Wojciech Roskiewicz, Małgorzata Krowicka,



Clients: twelve innovative, international technology

Park, Kraków Technology Park, Science and Technology Park Gliwice, Pomeranian Science

Ithasar Kinkel, Philip Friebel, Wojciech Muras Michał Turowicz, Maria Krukowska, Jungtaeg Oah, Kiseon Lee, Kamila Godosz



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Badań i Rozvinju



Managing Europe's forests sustainably

INTEGRAL – Future-oriented integrated management of European forest landscapes

Places of recreation and retreat or sources of raw materials? The European cooperation project INTEGRAL is examining the challenges involved in modern and sustainable forest management.

covered by forest. But who is allowed to use this forest? Who determines its value as a resource for commercial exploitation, a local recreation area or an ecosystem deserving of protection? If we are to take account of these different interests and use forests in an economically, environmentally and socially responsible way, then we need to rethink how they are managed.

The special importance of

communication

Over one third of Europe's total area is create awareness among relevant actors and the general public of the need for sustainable forest management. To this end, the Leipzig researchers are also defining criteria for effective knowledge transfer.

> Duration: 11/2011 - 10/2015 Funding: European Commission, 7th Framework Program of the European Union, Grant agreement -Nr.: 282887

Partners: 21 partners from 13 EU countries, including Germany: Technische Universität München, Institute of Forest and Environmental Policy, University of Freiburg

Team: Annamaria Riemer, Inga Žirkova, Jördis Winkler, Brett Aho Project website: www.integral-project.eu

Consequently, experts from 13 countries are working to develop new policy and management approaches to sustainable forest management as part of the EU-wide project INTEGRAL (Future-Oriented Integrated Management of European Forest Landscapes). Their findings are enabling a range of actors to assess the impact of environmental, socio-economic and political factors on the development of forest landscapes. As part of INTEGRAL, the Fraunhofer Center for International Management and Knowledge Economy is formulating recommendations for action with regard to putting strategic concepts into practice. Communication is particularly important in this context. It is necessary to





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erth Programme for research, techny

Transdisciplinary research was conducted to analyze the rrent challenges for European forest policy, Forward-looking approaches to forest policy and the future management of forest landscapes in the EU were then developed on this basis.



FRAUNHOFER CENTER FOR INTERNATIONAL MANAGEMENT AND KNOWLEDGE ECONOMY

Célia Gavaud has more than 12 years' experience relating to European projects, and has coordinated more than 15 initiatives in the innovation and growth field. She holds two Masters' degrees in International Policy and Diplomacy and European Affairs, and is a French national and enthusiastic European who has lived in the UK, Germany and Italy. In relation to the PROGRESS-TT project, Ms. Gavaud oversees the relationship with the Commission, the consortium management, and third party stakeholders, and is responsible for the smooth delivery of project tasks, deliverables and milestones.



Célia Gavaud, PROGRESS-TT Coordinator at Pera Consulting (UK) Ltd.

Professionalizing technology transfer in Europe

How can technology transfer from universities and public-sector research institutions in Europe be improved? An interview with Célia Gavaud, Director of the European project PROGRESS-TT, and Lutz Maicher, Head of Competitive Intelligence Unit at the Leipzig Fraunhofer Center.



Contact: JProf Dr. Lutz Maicher Head of Unit Competitive Intelligence Junior Professor Technology Transfer at Friedrich-Schiller-Universität Jena lutz.maicher@moez.fraunhofer.de +49 341 231039-127 Leipzig Fraunhofer Center researchers from the Competitive Intelligence Unit are part of the PROGRESS-TT consortium, which seeks to transfer functioning growth concepts from the private sector to technology transfer offices. Part of the European project involves developing a training program to build the capacity of specialists in the area of technology transfer. Ms. Gavaud, the European project PROGRESS TT stands for "public research organization growing Europe through best practice solutions for technology transfer". What does the project aim to achieve within the next three years?

Gavaud: PROGRESS-TT is a pilot initiative to gather best practice around the process of technology transfer and to develop and test a suite of tools, methods and insights with selected technology transfer offices in the EU Member States and Associated States. PROGRESS-TT's ambition is to increase the efficiency and effectiveness of the technology transfer process in the European Union.



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Patrick McCutcheon, Senior Policy Officer, Director-Genera **Research and Innovation** European Commission

"Many universities and public research organizations in Europe do not have sufficient technology transfer competence or capacity to attract the financing needed to commercialize the outcomes of their research, and as a result do not have access to capital. For this reason, the European Commission supports PROGRESS-TT as an accompanying measure to improve the investor readiness of technology transfer offices and to facilitate access to the Technology Transfer Financial Facility (TTFF), a new financial facility it plans to launch to promote such technology transfer."



Erik Vane, General Manage of ASTP-Proton

"The PROGRESS-TT consortium is working towards creating sustainable impact for supported technology transfer offices, helping them realize their potential for growth. The technology transfer professionals will develop and decrease risks associated to the commercialization of research results, bringing them to a stage of maturity when they are both relevant and attractive to potential investors, industry and society. **PROGRESS-TT's** approach is arguably the most important development in recent years in the technology transfer field."

Within PROGRESS-TT the Leipzig Fraunhofer Center is leading the development of a capacity building strategy for technology transfer professionals in Europe. What is behind this strategy?

Maicher: The capacity building strategy will enable all stakeholders in the technology transfer process to identify the main barriers to success and to set up a tailored change management process to overcome these barriers. Missing commitment of the university management, insufficiently structured in-office working processes or limited access to tailor made tools and data are issues which we often hear about in practice. We directly target these problems.

What does the practical implementation of the capacity building strategy look like?

Maicher: We start by using the CCODE™ which is a growth model invented and successfully implemented for private companies by Pera Consulting. Together with selected technology transfer offices, we will then directly work to improve their capabilities, capacity, opportunities, desire and environmental setting through tailor-made teaching and coaching modules. We will partner successful technology transfer offices with other high-potential technology transfer offices to establish knowledge transfer between the two.

be launched?

Gavaud: The selection process for recipients of the PROGRESS-TT support activities is currently being refined. Towards the end of 2015 a clear methodology will be established and implemented based on research output, exploitation effectiveness and efficiency of the technology transfer process. The first support activities will be launched during the second quarter of 2016. We will also be seeking involvement of the best performing technology transfer offices in Europe to act as mentors for program participants.

Duration: 1/2015 - 12/2017

unding: The projext Progress-TT (Public Research

Partners: Pera Consulting (UK) Ltd, ASTP-Proton, DSM Nutritional Products, Knowledge Innovation Market, MI.TO Technology, Philips Intellectual Property & Standards, University of Bologna, VTT Ventures



Ms. Gavaud, who is eligible for participating in the capacity building activities? When will the first activities

rganisation Growing Europe through best practice olutions for Technology Transfer) has received funding from the European Union's Framework Program for Research and Innovation, Horizon 2020, No. 643486

<u>Technology transfer</u> 'Technology transfer' is an econo-mics term. It refers among other things to the transfer of industrial methods to developing countries and the training of engineers and researchers at western universities and research facilities. It also includes the commercial use of research findings and their conversion into marketable products and services. This last aspect is the focus of PROGRESS-TT.

<u>Capacity building</u> Capacity building is about enhancing knowledge, leadership qualities and the ability to make more effective use of one's own resources, as well as to realize sustainable goals and play an active role in shaping the future of a company, an industry or a state

lorizon 2020 lorizon 2020 is the European lnion's largest research and innovation funding program to date. Launched in 2014, it is providing around EUR 77 billion in iding over a seven-year period (2014-2020). Horizon 2020 promote ollaborative projects designed to create sustainable growth and long-term jobs in Europe and to boost the competitiveness of the FU









The four winners of the successful cooperation projects were announced on March 27th, 2014 at the Chemintz Messe, and were each presented with prize money valued at 5000 Euros. (Photo: Wolfgang Schmidt).

"In western German border regions, organizational structures developed as part of a longer process, facilitating ongoing cross-border cooperation between SMEs themselves and between SMEs and research institutions. Well-organized cooperation in the areas of research, development and training offers a genuine opportunity for the German-Polish and German-Czech border regions, whose structures have been largely weak to date. The project impressively documents the notable cross-border partnerships that have already developed."

Iris Gleicke, Member of the German Bundestag, Parliamentary State Secretary and Federal Government Commissioner for the New Federal States.

Joint research activities in the German-Polish-Czech border region

What are the ingredients of successful research cooperation between German, Polish and Czech SMEs? - Insights into the German-Polish and German-Czech border regions.

Germany, Poland and the Czech Republic have long engaged in neighborly cooperation. However, the border regions remain structurally weak, with little experience of jointly developing demand-driven cooperation structures.

New strategies for the

German-Polish-Czech border

region.

Bundestag, Parliamentary State Secretary

and Federal Government Commissioner

for the New Federal States launched a

research project on cross-border cooper-

ation between SMEs in the border regions

in 2013. This project was implemented by

Leipzig Fraunhofer Center researchers in

cooperation with the Institut Chemnitzer

Maschinen- und Anlagenbau e.V. (ICM).

Iris Gleicke, Member of the German

Learning from best-practice projects in the border regions

The team compiled examples of successful partnerships in the areas of research, development and training, and organized a competition to recognize successful projects. This competition, in conjunction with expert presentations and interviews with companies, served to identify the factors promoting and hindering cross-border cooperation in these regions. The results were compared with reference regions in western Germany and presented at a closing conference.

Duration: 7/2013 - 12/2014 lient: MdB Iris Gleicke, Commissione for eastern German

Funding/Partners: ICM – Institut Chemnitzer schinen- und Anlagenbau e.V., European versity Viadrina, Frankfurt (Oder)

<u>Team</u>: Steffen Preissler, Dr. Harald Lehmann, Anzhela Preissler, Velina Schmitz







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EUROPA-UNIVERSITÄT FRANKFURT (ODER)



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Dispensing head © Fraunhofer IWS



Propeller, injection molding core with meander cooling channel, Bayonet nozzle. © Fraunhofer IPK

- A 3D printer builds three-dimensional objects laver by layer. The printing process is computer control on a predefined 3D model. Typical materials that are lay ered on top of one another in liquid form by a 3D printer nclude plastics, synthetic resin, ceramics and metals
- tive-generative manufacturing ve-generative manufacturing in enerating' a component by successively 'adding ayers of material, usually using laser light or an electron beam. Unlike conventional manufacturing processes, additive-generative manufacturing makes it easy to combine several different materials, produce complex components at no additional cost, and offe replacement parts without having to store them.
- Industry 4.0 The real and virtual worlds are converging into the "Internet of Things" in what is being dubbed the "Fourth Industrial Revolution". The term "Industry 4.0" refers to the goal of getting industry into shape for this process. Clients and business partners, for example, will be directly integrated nto business and value creation processes, while intelligent monitoring will be used to manage and optimize manufacturing processes in real time.

KNOWLEDGE AND TECHNOLOGY TRANSFER

AGENT-3D – Additive-generative manufacturing

The 3D-Revolution for products manufactured in the digital age.

Additive-generative manufacturing is revolutionizing the industrial production process globally. Leipzig Fraunhofer Center researchers are examining ways of readying the new technologies for the market in eastern Germany. 3D printing • and laser and elec-The production processes of the future

tron-beam based procedures should enable individual components to be manufactured with a smaller amount of material in a shorter time frame in future, whether they be joint prostheses made from maize starch or titanium components for a gas turbine burner.

Concept for strategy development

Twelve research institutions and more than 45 companies launched the strategic alliance AGENT-3D in 2014, with scientific oversight provided by the Fraunhofer Institute for Material and Beam Technology Dresden. The interdisciplinary team intends to build a strong network of representatives from industry, SMEs and research institutions in eastern Germany and develop additive-generative manufacturing • into a key technology. Leipzig Fraunhofer Center researchers from the Knowledge and Technology Transfer Division are supporting the alliance as it develops its strategy. The organizational, communications and innovation concept of the alliance are based on a market study, expert interviews and partner surveys.

Following the strategy phase, the first technology projects are set to be implemented starting from autumn 2015. The research institutions involved will document, analyze and evaluate their progress and results. The Leipzig researchers will then focus on the question of how additive-generative manufacturing techniques are changing conventional manufacturing processes and what the production processes of the future might look like.

Duration: 1/2014 – 6/2015 (duration project: 2014 - 2020) **<u>Client:</u>** Federal Ministry of Education and Research Partners: Twelve research institutions ore than 45 companies Team: Steffen Preissler, Dr. Harald Lehmann amaria Riemer, Marianne Polkau, Inga Žirkova







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Criteria for application-based support policy

An innovative support policy in Germany could help researchers to identify and leverage the economic potential of their work at an early stage.

Universities and non-university research institutions hold untapped potential in the form of scientific findings that, if used commercially, could drive significant economic progress. As part of the project "Ways of Promoting Vertical Transfer from Research and Academia - Lessons from Support Policy in Practice", or "WTT_Lehren" for short, Leipzig Faunhofer Center researchers are identifying support criteria that contribute to the commercial success or failure of a research project.

Recommendations for innovative support policy

The Leipzig researchers began by conducting an empirical study of the ForMaT support program (Research for the Market im Team) of the German Federal Ministry of Education and Research (BMBF). This program brings economists and researchers from different disciplines together. A comparison of evaluation reports of other support programs, including EXIST (University-Based Business Start-Ups) and VIP (Validation of the Innovation Potential of Scientific Research), and supplementary interviews with program managers and participants provide the basis for further analysis. The study examined the influence of cooperation partners, professional science communication, financial instruments and transfer service providers or the researcher's personality. The goal of the Leipzig Faunhofer Center researchers is to derive recommendations for the BMBF on the further development of application-based support policy in Germany.

Duration: 11/2014 - 10/2015

Funding: Federal Ministry of Education and Research (BMBF) Team: Dr. Harald Lehmann, Steffen Preissler,

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> für Bildung und Forschung

KNOWLEDGE AND TECHNOLOGY TRANSFER

Reviewed: the Knowledge and Technology Transfer of Leipzig's companies

What are the requirements of Leipzig's companies in terms of knowledge, technology and support for transferring their knowledge and technology? The second Leipzig transfer report endeavors to provide an answer to this question.

Creating links between business and academia is a key priority for technology transfer in Leipzig. Commissioned by the Leipzig Office for Economic Development, Leipzig Fraunhofer Center researchers from the Knowledge and Technology Transfer Division assessed the progress made in this area and the requirements of companies in the second Leipzig transfer report.

They conducted a survey in February 2014 to identify

- the requirements of companies for knowledge and technology,
- the requirements for specific transfer services, and
- how Leipzig-based companies assess the availability of knowledge, technology and transfer services in Leipzig.

Carried out in close cooperation with representatives from the Leipzig Office for Economic Development, the survey revealed that there is a particularly great demand for computer science and technical and economics expertise. This includes the need for support in terms of resources and transparency. Companies in Leipzig have to draw on resources from other regions to meet their knowledge and technology requirements.

Duration: 12/013 - 10/2014 **<u>Client:</u>** City of Leipzig Partners: Twelve research institutions nd more than 45 companie Team: Steffen Preissler, Dr. Harald Lehmann



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FRAUNHOFER CENTER FOR INTERNATIONAL MANAGEMENT AND KNOWLEDGE ECONOMY



Participants of the 2014 Transnational Financing wor fer-Forum in Berlin







KNOWLEDGE AND TECHNOLOGY TRANSFER

Achieving sustainable economic development by increasing resource efficiency in SMEs

PRESOURCE – Promotion of Resource Efficiency in Central European small and medium-sized enterprises.

Natural resources are becoming increasingly scarce. SMEs are asking themselves whether they are making efficient use of materials for their products, consumables and auxiliary materials, and energy and water in their manufacturing processes. This is the starting point for PRE-SOURCE, an EU project which aims to conserve resources and promote innovation in Central European SMEs.

Products that are highly material and energy efficient save money and make a company innovative and competitive. The benefits are self-evident, but in many cases difficult to quantify in monetary terms.

EDIT Value analyses of a company's overall situation

Developed as part of the EU project PRESOURCE, EDIT Value (Eco-Innovation Diagnosis and Implementation Tool for Increase of Enterprise Value) is an instrument that can easily be used by companies to conduct a structured self-assessment in order to identify how and where they can reduce costs and work more efficiently. EDIT Value examines a company's overall situation: its products, its management, its strategy and the interests of its workforce, shareholders, the local community and competitors. It produces a set of sound recommendations tailored to the company in question, with a customized cost-benefit analysis.

Created by the Leipzig Fraunhofer Center researchers, the cost-benefit analysis shows capital providers when it is worth investing in resource-efficient changes and how environmental efforts can be translated into monetary terms. The researchers in Leipzig have also produced a virtual financing guide, which presents alternative financing instruments such as crowdfunding, venture capital and future funds as alternative sources of finance for SMEs.

Duration: 7/2012 - 11/2014 Client: European Commission Supported by: EFRE - Central Europe Program

Funding: Federal Environmental Agency (Leadpartner D), Enviros Ltd. (CZ), Corvinus University of Budapest (HU), Stenum Ltd. (AT), Enea (IT), Pro-Akademia (PL), German Federal Ministry for the Environment, Conservation, Building and Nuclear Safety (D)



Capital for greater resource efficiency



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Contact: Jens Rockel Deputy Head of Innovation cing Unit

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Oliver Mauroner has held the post of lunior Professor for Innovation and Creativity Management at the Bauhaus Universität Weimar since September 2013, researching ways for organizations to identify and exploit creative potential. He is involved in the university's neudeli start-up incubators and assists start-ups with putting together business plans and finding start-up funding.

The University of Wroclaw and the man Polish Science Foundation join project provides an overview of academi dations and start up cultures in nd and Germany. Not only German ut also Polish experts and Funding wer nterviewed as part of a country compari analysis. The responses identified the llenges, in particular with relation to the social sciences and humanitie

"The Leipzig symposium provided me with some great food for thought and some very interesting contacts for my work in the start-up workshop neudeli at the Bauhaus-Universität Weimar. There was some very frank discussion of the various challenges involved in supporting start-ups from the social sciences and humanities fields."

JProf. Dr. Oliver Mauroner

Social sciences and humanitiesa source of self-confident, successful entrepreneurship

October 2014 saw participants in an international symposium at Leipzig's Social Impact Lab take an in-depth look at the start-up culture in the social sciences and humanities.

Working with researchers from the nificance of the humanities and social University of Wrocław, the team, headed by Wojciech Roskiewicz from the Leipzig Fraunhofer Center, examined the similarities and differences between the start-up cultures of the social sciences and humanities in Germany and Poland. The one-year study was based on a review of the relevant literature and on comparative interviews with a range of sponsors, multipliers and start-up entrepreneurs in Germany and Poland.

The subsequent analysis showed several different approaches to start-ups. The study also identified factors that facilitate entrepreneurship within the humanities and social sciences. To conclude the one-year project, over 40 researchers and practitioners from sectors providing support to start-ups were invited to the Social Impact Lab in Leipzig to discuss the current situation with regard to the start-up culture in the social sciences and humanities fields.

sciences to the economy, culture and regional policy. The subsequent panel discussion was primarily an opportunity to hear from start-up founders themselves, who reflected the same kind of self-confident, successful entrepreneurship as the start-up founders surveyed as part of the study had done. Why is entrepreneurship in the social sciences and humanities fields still seen as the exception? The discussion participants were all in agreement that university start-up funding programs need to focus more strongly on start-ups in the social sciences and humanities, and that the start-up entrepreneurs themselves have a duty to raise their profile as role models for students interested in founding start-ups.

Duration: 7/2013 - 6/2014 Funding: German-Polish Science Foundation

Team: October 2014 saw participants in an international symposium at Leipzig's Social Impact Lab take an in-depth look at the start-up culture in the social sciences and humanities.

"No specific application" - this ludicrous notion was dispelled in an address by Professor Peer Pasternack, Director of the Institute of Higher Education Research at Martin Luther University Halle-Wittenberg. The political scientist illustrated the sig-



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aluminium processing firms:

Technologist: "At last, I now see how much energy is used by the various machine settings, which allows me to make the manufacturing process more efficient and to ensure and monitor compliance with requirements on the part of the machine operators."

Technologist: "The automated outlier analysis provides an excellent overview of manufacturing issues and maintenance work that needs to be taken care of, such as replacing or repairing a frequency converter."

Controller: "I can now produce monthly reports at the touch of a button. The figures are valid and I now have more time and opportunity than ever to address and analyse energy correlations. We have already achieved a great deal, but we know that there is still considerable potential to be exploited in our processes."

Works manager: "Having a transparent overview of the factors influencing our energy consumption allows us to more effectively manage our manufacturing processes and helps us make decisions about further investments."

Making manufacturing processes energy efficient

EPVI is a software solution that can analyze the potential for optimizing production processes. The program is the fruit of cooperation between a regional company and the Leipzig Fraunhofer Center.

Together with Fraunhofer Center Leipzig researchers, you developed EPVI, an energy process optimisation technology for the manufacturing industry. What has come out of this three-year work partnership?

Bergmann: With EPVI, we have produced a software solution that combines energy and manufacturing data to identify potential for saving energy during the manufacturing process. This technology is of tremendous interest to our clients. The project with the Fraunhofer Center has allowed us to flesh out our idea, record and analyze customer requirements, and design evaluation tools. With EPVI, we are offering industrial enterprises a program that they can use to make their manufacturing processes energy efficient and more cost-effective.

industry?

Maicher: EPVI is co-creation in practice - together with ccc, we have taken the idea from the conceptual stage and turned it into a technology used by the industry. It all started with ccc's vision to determine how much electricity, gas, compressed air and heat are used at each stage and in each batch during the manufacturing process. For example, a plant operator can use EPVI at any time to view the resource needs for the part currently on the machine and even take immediate action in the event of excessive energy consumption to enable savings of four to five per cent. This is what we refer to as the intelligent-energy factory.

What role does EPVI play in the German Government's plans for Industry 4.0?

Maicher: Industry 4.0 is primarily about the digitisation of manufacturing processes. EPVI already allows manufacturing firms to use hundreds of resource meters a second to manage energy efficiency in industrial works. EPVI is big data. This technology does not yet steer manufacturing processes on its own; rather, it helps technologies to operate on an energy-efficient basis. But I can also see manufacturing processes being managed on an automated basis in future.

What is so innovative about this technology and what energy savings does it deliver for the manufacturing



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Testimonials from circuit board manufacturers:

Quality management officer: "Having transparent information about energy use is a key prerequisite for introducing ISO 50001. We also require a good concept and a software program tailored to our needs. We have found both of these and are fully prepared for the next few years. Following monitoring, we are concentrating on analysis. A high degree of transparency is needed to allow conclusions to be drawn about causes and potential."

Technician from a media service: "The process of managing energy data always entails many changes and adjustments. I am now able to implement new measurement points very quickly and, most importantly, measure the bulk of energy consumption with virtual meters."

Technical manager: "Combining energy, manufacturing and order data is the only way to draw conclusions about how to improve the energy-efficiency of manufacturing processes. In this way, we are able to improve and optimize our processes on an ongoing basis, which saves on costs. The key thing is to put energy-efficient measures into practice in all departments throughout the company. This software helps us do so, as it allows all employees to work with the system, be they works managers, controllers or technicians."



...so the possibilities of EPVI have not yet been exhausted?

Bruckner: By no means. There are many different ways of distributing the load, that is, actual energy consumption, more effectively in the manufacturing industry. So far, this potential has been exploited primarily to reduce peak loads. In future, there will also be a focus on using demand-response measures as regular buffers to improve the use of renewable energies.

How much interest is there in EPVI on the German and international markets?

Bergmann: The level of interest among enterprises is very high as a result of economic pressure and due to the legislative requirements of Germany's Renewable Energy Act (EGG). In setting the energy saving targets, Germany is leading the way on this issue internationally.

Bruckner: Efficient data management allows flexibility potential to be pooled and sold on the balancing energy markets. EPVI allows enterprises to tap this potential for their manufacturing processes and to save on valuable resources.

How is cooperation between ccc software and the Fraunhofer Center Leipzig being continued?

Bergmann: There is additional potential to be leveraged by promoting the circulation of information between energy producers, network operators and consumers. We intend to work with the Fraunhofer Center Leipzig to address these forward-looking topics and develop technologies for the future.

JProf. Dr. Lutz Maicher, Sven Bergm and Prof. Dr. Thomas Bruckner (ltr.)



Sven Bergmann, Division Manager Industriesoftware, ccc software gmbh We offer industry ventures and porations a design solution to make shing processes energy efficient."







Investing in young professionals and technologies promotes environmental awareness

Claudia Domel has been working as a research fellow at the Leipzig Fraunhofer Center since 2007. Since 2009, she has been responsible for the international funding activities of the German Federal Environmental Foundation (DBU) in Central and Eastern Europe as its Special Representative for the region. Domel's research work also focuses on developing networks for environmental technology and knowledge transfer in this area.

Ms. Domel, what are the tasks and Environmental awareness cannot be taken challenges in the region for which you are responsible as DBU's Special **Representative?**

I am responsible for the Baltic states, for Kaliningrad and for Bulgaria, Romania and the former Yugoslav countries. While these countries span a very large geographical area, they approach environmental issues in a similar way. Environmental conservation has taken a back seat as all these nations grapple with economic problems. The challenge is to show that, far from being a "luxury issue", environmental conservation is essential to maintaining and improving our health and guality of life. Environmental conservation does not only network. Some planners and sewage incur costs, but can also deliver savings for businesses and municipalities, for example through the use of resource-efficient technologies. In this context, we are working with a range of institutions in the target region, seeking to use start-up financing and bilateral cooperation to introduce innovative environmental technologies and a specialist knowledge transfer. Investment in young professionals is a key factor here.

for granted; rather, it must be fostered.

Which one of the environmental projects that you have supported in recent years remains most vivid in your memory?

There are a lot of very good projects the DBU funded in Central and Eastern Europe. One project that I remember as a truly European experience with participants from all the Balkan countries was particularly helpful in avoiding mistakes that were made in the former GDR after the fall of the wall. EU regulations require all countries to connect their municipalities up to a sewage system builders are pursuing their own interests, using EU funding to build massive sewage works, even in places where there is no apparent demand. Smaller scale, local sewage plants are more cost-effective for smaller communities and easier for them to run. Because many decision-makers in the municipalities were overwhelmed by the decision, we concentrated our project work on knowledge transfer, put together

a handbook and trained engineers in the specialist planning of treatment works to enable them to pass on their knowledge to their own countries.

Your work as a research fellow at in dialogue with colleagues at the instithe Leipzig Fraunhofer Center also entails project activities in Central and Eastern European countries. What project experience has been particularly helpful to you in your work as the

DBU's Special Representative?

I have worked on environmental issues at the Leipzig Fraunhofer Center from the outset, that is, since 2007. Of course, conducting a great deal of research and numerous analyses in the environmental field and collaborating on an ongoing basis with specialist institutions in the target countries as part of several projects is helpful in developing knowledge. Consequently, my DBU colleagues consult me on many matters concerning the environment, the innovative components of project applications, the relevance and expertise of project partners, options for placing project results on a sustainable footing in these countries, and the potential impact of these results in these nations.

Working on projects and engaging tute never fails to provide me with fresh impetus for my role at the DBU. I also find it very helpful to be able to work with the scientific sources and databases of the Fraunhofer-Gesellschaft and last but not least have the structure and generous support of our administrative team behind me whenever I need to make travel arrangements or deal with issues in projects. Most of all, I appreciate the working relationship I have with my three research assistants, who originally come from South-Eastern Europe or have close relations with those countries. In addition to supporting me with sound research, they afford me personal access to the cultures and unique features of their home countries.

How is the Leipzig Fraunhofer Center supporting you in your work as the DBU's Special Representative?



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Sustainability Management and Infrastructure Economics

Our experts in the business area **Sustainability Management and Infrastructure Economics** advise decision-makers worldwide in the design of environmental policy solution strategies and energy management instruments. They promote social acceptance in relation to the implementation of these and, together with interested companies, they develop innovative business models that allow them to expand in the international environment of the "green economy".

The economists, political theorists, sociologists, engineers and scientists carrying out interdisciplinary and application-oriented research in this area are developing sustainable solutions for private and public institutions (companies, municipalities, associations, ministries).

The customers are supported here in meeting the challenges that result at a company, municipal, national and global level from the attempt to align economic activities more closely with the ideal of a sustainable economic approach.

This business area currently consists of two market segments that deal, in particular, with energy-related issues.



Prof. Dr. Thomas Bruckner

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We predict the wholesale price for energy, so called spot-market prices, in advance.

We then use these to examine the profitability of business models in the energy sector.

We design energy and climate policy instruments.

We investigate the potential for acceptance of renewable energies through climate law and politics.

Hendrik Kondziella

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Energy Management and Energy Economics

Central to our energy-related and application-oriented research activities is the Led by: Hendrik Kondizella integrative analysis of the economic, ecological and social aspects connected with the provision of energy services at a company, municipal, national, European or global level. We specialize in:

Head of Unit Energy Management and Energy Econor

- Economic optimization of innovative energy systems
- Design and economic assessment of innovative energy-related business models (in the context of a fast-changing energy-policy framework)
- Modelling and economic analysis of the energy markets to assess the future development of this framework
- Analysis and design of instruments for energy and climate policy (inclusive policy impact assessment)

The quantitative analysis of the areas of research mentioned is conducted using innovative energy system models, energy management models, agent-based models and integrated assessment models that have been developed in the last few years and successfully implemented to advise decision-makers in the areas of energy management and environmental policy.

Stakeholder Dialogue and Social Acceptance

Our application-oriented research relates in particular to success factors (best Led by: Prof. Dr. Thomas Bruckner practice) and barriers that promote or impede the creation of sustainable energy systems at an international level. Our specialist fields are:

- Development of innovative methods to cope with transformation processes in companies, regions and nations resulting from the energy transition
- Social acceptance research regarding innovative technologies in the energy sector
- Integrated evaluation of infrastructure projects and conducting stakeholder dialogues (taking economic, ecological and social aspects into consideration)
- Designing strategies that make it possible to achieve cooperative solutions in international negotiation processes related to environmental protection

In terms of methodology, our analyses are based especially on the identification of best practice examples, the comparative analysis of the situation in different countries, approaches from a political science perspective and the use of innovative dialogue and mediation processes.

Head of Unit Stakeholder Dialogue and Social Acceptance





Reservoirs of the Nant de Drance

chel Martinez 2012

© Simon Havlik, 2005

Basel refuse incineration plant at

Integrated Resource Planning (IRP)

Energy companies want to generate ctricity efficiently, while it is in

ustomers' interest to use as little

ctricity as possible. However,

or many years this reduced the ue and profits of energy

oducers. A resource-efficient ent system can resolve this conflict of interest. Instead of

ing kilowatt hours, providers sell

specific energy service. Revenue and

in terms of electricity sales and it is now worthwhile for energy provider

ofit are no longer measured solely

pumped-storage power station. With an output of 900 MW, it will

nerate around 2.5 billion kWh of electricity per year when it

nces operation at the end of



software architecture of the IWB energy system model



Energy Data Management

SUSTAINABILITY MANAGEMENT AND INFRASTRUCTURE ECONOMICS

From municipal energy supplier to resource-efficient energy manager

Basel's municipal utility IWB is working to become an energy management provider with support from Leipzig Fraunhofer Center researchers. In so doing, it is responding to the liberalization of the Swiss energy market. From 2018, Swiss customers will be free to select a provider of their choice on the European energy market.

With a view to securing its position on the energy market in the Basel region, IWB intends to work with its customers in future to optimize its energy supply and become a modern energy services provider. The business models to be analyzed should include all energy sources (electricity, heat, biogas and natural gas). Leipzig Fraunhofer Center researchers from the Energy Management and Energy Economics Unit and experts from Leipzig University are providing specialist support for the implementation process.

Simulating customer-side measures

The interdisciplinary team first developed the IRPsim simulation model, which simulates Basel's energy supply and demand structure

for the next 20 years. This software allows IWB to plan for the medium term and select the most cost-effective energy measure - for example, when deciding whether or not to introduce variable electricity tariffs.

Answers to strategic questions

The simulation will also provide answers to strategic questions in future - questions such as: which customer groups are particularly attractive to competitors and how can IWB secure the loyalty of these groups in the long term? At the same time, IWB is seeking to blaze fresh trails in its model development. For example, it is planning to integrate the decision-making behavior of its customers into the software. It is making use of the Big Data Center at Leipzig Fraunhofer Center to process and analyse its corporate and customer data.

Kommunale Energiewirtschaft

"In Leipzig Fraunhofer Center, we have a project partner that stands out from other providers thanks to the breadth of its energy industry expertise. Its previous results have convinced us on all counts. The team of researchers at the Leipzig Fraunhofer Center is able to take into account additional aspects relating to market development and consumer behavior."

Patrick Wellnitz, Head of Energy Solutions, Development





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facade with pool and Flora ntain Nousch anstein Castle ir

- Blicking Hall, United Kingdom
- Karlštein Castle, Czech Republic rad/Kybertec I td

"This project has been a success story."

Mr. Dr. Kurt Vandenberghe, Director for Directorate Climate action and resource efficiency, Directorate-General for Research and Innovation, European Commission

Protecting cultural heritage in times of climate changethe EU project "Climate for

Culture"

"Climate for Culture" can look back on five years of successful cooperation. Twenty-seven partners from 14 countries investigated the impact of climate change on the indoor environments of historical buildings and developed mitigation and adaptation solutions for the future.

From Neuschwanstein Castle to the Sistine Chapel, many world heritage sites are suffering the effects of climate change. This is because rainfall is increasing and with it the moisture levels in the buildings. An international team of researchers investigated the impact this is having on the indoor environments, art collections and energy demands of historical buildings as part of the EU project "Climate for Culture".

Climate change is altering the climate of spaces inside historical buildings

Leipzig Fraunhofer Center researchers were serving as finance and project managers in the EU project. With a total funding budget of some EUR 5 million, Climate for Culture is one of the largest cultural research projects ever established, bringing together experts from 27 partner institutions and 14 countries. With scientific coordination from the Fraunhofer Institute for Building Physics, the project for the first time coupled climate modeling with building simulation tools and applied these tools in castles, museums and churches.

Climate for Culture – brochure summarizes results

A key result of the research, aside from the climate, energy-demand and risk maps, is the software that the owners of heritage property will be able to use in future to access online advice as to how to manage their historical buildings in an energy-efficient and sustainable manner. Additionally, the brochure "Built Cultural Heritage in Times of Climate Change", developed by Leipzig Fraunhofer Center researchers, summarizes selected findings from the project.

Duration: 11/2009 - 10/2014

Partners: Fraunhofer Institute for Building Physics IBP ofer Institute for Silicate Research ISC, Czech echnical University Prag, Italian National Research ncil - institute of Atmospheric Sciences and Climate Iniversity of Zagreb, Foundation for Research and - Institute of Electronic Structure & Laser Max-Planck-Institute for Meterology, Technical Universit unich, Eindhoven University of Te ogy, Ui of Liubliana, Gradbeni Institut ZRMK - Center for Indoo nt, Building Physics and Energy, Uppsa niversity - Campus Gotland, Andreas Weiß - Freelance storer, Jan Radon - Engi Consulting & Software Development, Krah&Grote Measurement Solutions, TB Käferhaus GmbH, Haftcour Ltd., ACCIONA Infrastructure, Bavarian Department of State-owned Palaces, Gardens and Lakes, Bavarian State Painting Collections – Doerner Institute, National Trust for England, Wales and Northern Ireland, Kyberte Ltd., Glasgow Caledonian University, Center for Documentation of Cultural & Natural Heritage Egypt Jonathan Ashley-Smith – Consultant for Conservatio Risk Assessment, The National Institute of Cultural Heritage France, The London School of Economics and Political Science, Foundation Salvatore Mauger

Funding: European Commission (7th Framework Program



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Interdisciplinary Research **Collaboration for Cultural Heritage Conservation**

With a comprehensive study that examines the economic factor and the social value of cultural heritage, the Leipzig Fraunhofer Center is collaborating in a Fraunhofer-Gesellschaft model project which aims to develop innovative conservation and digitalization concepts for cultural heritage artifacts.

On July 2nd, 2014, representatives from the Fraunhofer-Gesellschaft, the Leibniz-Gemeinschaft and the Prussian Cultural Heritage Foundation (SPK) signed a formal agreement with the Staatliche Kunstsammlungen Dresden (Dresden State Art Collections) and the Saxon State and University Library Dresden (SLUB). The Research Alliance Cultural Heritage (FALKE) thereby responded to former State Minister Prof. Dr. Sabine von Schorlemer's intention to bundle the social, natural and cultural studies expertise of these partners.

Germany. It aims to jointly develop new methods for the restoration and conservation of cultural artifacts and to further intensify the knowledge transfer between research and practical application. Another objective is to embed the significance of cultural heritage more deeply in the public consciousness.

Study on cultural heritage as an economic factor

In a model project, experts from the Leipzig Fraunhofer Center's Stakeholder Dialogue and Social Acceptance Unit will now evaluate cultural heritage as a regional economic factor, its social value and the significance of investing in preventive and restoration measures for the first time by conducting a study that uses the Dresden art collection museums as an example. They will also support the The research alliance is unique in Fraunhofer-Gesellschaft project managers to coordinate and communicate the entire project. The Executive Board of the Fraunhofer-Gesellschaft has agreed to make 1.5 million euros available for the project over the next three years.

Duration: 6/2015 - 7/2018

Partners: Fraunhofer-Gesellschaft, Leibniz-Gemeinschaft, russian Cultural Heritage Foundation, Staatliche Kunstsammlungen Dresden (Dresden State Art Collections), Saxon State and University Library Dresden

Funding: Fraunhofer-Gesellschaft Executive Board Team: Uta Pollmer, Urban Kaiser, Dr. Sandra Dijk





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Network for the energy and environment sector in the **Danube Region**

TREC – Transnational Renewable Energy Cluster – Donau

The "Transnational Renewable Energy Cluster (TREC) – Danube" project seeks to drive economic growth in the energy and environment sector in the Danube Region and to establish Leipzig as a strong research partner in this macro-region.

Since 2010, 14 countries with their different cultures, religions, languages and policies, including Romania, Bulgaria, Hungary, Serbia, Slovakia, Moldova and Ukraine have constituted the Danube Region, a macro-region of the European Commission. Since 2011, these countries have been pursuing a joint, uniform concept for promoting infrastructure, business, environmental conservation and prosperity.

Internationalization strategy for Leipzig energy and environment cluster

Leipzig Fraunhofer Center researchers from the unit Stakeholder Dialogue and Social Acceptance are linking Leipzig's Netzwerk Energie und Umwelt (NEU e.V.) with suitable partners and clusters in this region as part of the "Transnational Renewable Energy Cluster (TREC) -Danube" project. They are developing a long-term strategy for internationalizing the Leipzig-based network.

projects in the Danube Region

Funded by the German Federal Ministry of Education and Research (BMBF), the project has the goal of establishing European research projects and industry partnerships in the Danube Region. The intention is to work together on developing innovative energy and environmental technologies, development concepts as well as standardization and marketing concepts. TREC Danube has yielded initial fruit in the form of project initiatives in the fields of geothermal energy and biomass use.

"With the Leipzig Fraunhofer Center, both we as the cluster management team and our network members have access to professional support in our internationalization efforts in Central and Eastern Europe – something which is indispensable for developing a strong, well-functioning international platform." Daniel Reißmann, Cluster Manager, Leipzig's network for energy and the environment.



Collaborative European



Contact: Urban Kaise Research Fellow Unit Stakeholder Dialogue and Social Acceptance noez.fraunhofer.de +49 341 231039-150

Duration: 7/2014 – 7/2015

unding: Federal Ministry of **Education and Research**

Partners: German Biomass Research Center gGmbh (DBFZ) Leipzig's network for energy and the environment (NEU)

Leipzig's network for energy and ronment was awarded the Bronze Label by the European Cluster Excellence Initiative in 2013. This certificate underscores the cluster aspiration of bringing together panies, research institutions and vestors from the energy and envi nt sector at a Europe



Bundesministerium für Bildung und Forschung



Fraunhofer Center Leipzig-Cooperations, positions and coordinates

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Cooperations

Fraunhofer Big Data Alliance

In 2015, the Leipzig Fraunhofer Center became one of the 26 institutes belonging to the Fraunhofer Big Data Alliance. nlt contributes its economics expertise to the evaluation of digital data to this alliance, which offers a comprehensive range of market-driven Big Data solutions to companies, including the gualification of data scientists.

Fraunhofer Turkey Days: Increasing the cooperation with Turkey in business and research

As one of Europe's growth markets, Turkey is considered an emerging market. The country's steadily increasing economic output is therefore also accompanied by an increasing need for research and business collaborations. Nine Fraunhofer institutes participated in the Fraunhofer-Gesellschaft's respective contribution, the "Fraunhofer Turkey Days" project.

During the series of events in 2014, the Turkish industry was made aware of the Leipzig Fraunhofer Center's internationalization expertise, for example.

German-Korean innovation partnership goes ahead

In 2014, the Leipzig Fraunhofer Center signed a cooperation agreement with North Chungcheong Province, one of South Korea's leading regions in technology terms, and the Chungbuk Technopark. The goal of this agreement: to realize German-Korean research projects and exchange programs.

Cooperation agreement strengthens collaboration

extending its cooperation with the Korea Evaluation Institute of Industrial Technology (KEIT).Following two years of collaboration, the partners signed a cooperation agreement in March 2014. It is aimed at promoting new projects in the technology development field, and at creating incentives for Korean projects and investments in Germany.

step4EU – positioning Europe in the global knowledge economy competition

In early 2014, leading European researchers, including Fraunhofer Center Leipzig representatives, jointly established the step4EU network. The interdisciplinary, independent network intends to systematically examine political strategies and government spending in the areas of research, technology and education. It is hoped that this collaborative effort will contribute to raising the public profile of these issues. The network also intends to counteract the wealth inequalities within Europe.

National High Performance **Chemistry and Biosystems Technology Center cooperation** partner

The Leipzig Fraunhofer Center is one of eight Fraunhofer-Gesellschaft institutes that have supported the establishment of the National High Performance Center "Chemistry and Biosystems Technology" since 2014 with the aim of continuing to increase central Germany's importance as a research location.

Research cooperation with the Bioenergy Innovation Center

The Fraunhofer Center in Leipzig is In collaboration with the Bioenergy Innovation Center, the Leipzig Fraunhofer Center has been advising small and medium-sized enterprises in the area of bioenergy on how to launch their research results in the market fast and in a cost-efficient way since 2013.

Research Alliance Cultural Heritage

The interdisciplinary Research Alliance Cultural Heritage (FALKE) has been developing innovative processes for the conservation of cultural artifacts since 2008.

One of contributions made by the Leipzig Fraunhofer Center to the Fraunhofer-Gesellschaft, Leibniz-Gemeinschaft and Prussian Cultural Heritage Foundation alliance is a study on cultural heritage as an economic factor (page 100).

Academic support for institute media from a communication science perspective

The Fraunhofer Center Leipzig and Münster University of Applied Sciences' faculty of design are collaborating on the realization of communication projects with a special focus on visual solutions for challenging communication-related problems (communication design), for instance in the context of the Fraunhofer Center's Annual Report. Masters and Bachelors theses continuously focus on this subject. The "Content Marketing" and "Multi-Channel Publishing" projects are supported by the Institute of Communication and Media Research at Leipzig University through a junior professorship in online communication.

COOPERATIONS, POSITIONS AND COORDINATES

Working Paper

Fraunhofer

TECHVIEW REPORT

Fraunhofer

Techview Report Electric Buses

Technological aspects of the development of zero-emission buses in India



Investors source markets

Identification and assessment of investors source markets and sectors



Fraunhofer



Employer Branding

Employee Engagement in SMEs through Employer Branding



DEDATE

Personal Digital Data Economy







FRAUNHOFER CENTER FOR INTERNATIONAL MANAGEMENT AND KNOWLEDGE ECONOMY



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COOPERATIONS, POSITIONS AND COORDINATES





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To provide a better readabilty the new names of the divisions and units are being used in this annual report.



Teaching activities

Editorial notes

Prof. Dr. Thorsten Posselt

Professor of Innovation Management and Innovation Economic

University of Leipzig

Prof. Dr. Thorsten Posselt and Dr. Nizar Abdelkafi

Lecture (fall term 2014/15 and spring term 2015) Basics of Innovation Manager

University of Leipzig, bachelor's course in ics and Management Scienc

Lecture & Seminar (spring term 2015) Innovation Management in an International Context

University of Leipzig, master's course in **Business Management and Economics**

Prof. Dr. Thorsten Posselt and Steffen Preissler

Seminar (fall term 2014/15 and spring term 2015) Innovation Transfer and Sustainability

University of Leipzig, bachelor's course in **Economics and Management Science**

Prof. Dr. Thorsten Posselt, Dr. Friedrich Dornbusch and Manuel Molina Vogelsang

Seminar National Innovation Systems: Theory and Empiricism

University of Leipzig, bachelor's course in ics and Management Science

Prof. Dr. Thomas Bruckner (Lecturers: Marika Behnert and Sören Graupner)

Professor of Energy Management and Sustainability, University of Leipzig

Lecture & Practical (fall term 2014/15) Energy Technology

Lecture & Practical (fall term 2014/15) Energy Management

University of Leipzig, bachelor's course in iomics and Management Science

Prof. Dr. Thomas Bruckner

Lecture & Practical (spring term 2015) Energy Manag

Lecture & Practical (spring term 2015) Enerav Economie

Lecture & Practical (fall term 2014/15) Energy System Modelin

University of Leipzig, master's course n Business Management, Economics and Sustainable Development

-----Prof. Dr. Thomas Bruckner and

Dr. Dr. Ariel Hernandez

Research Seminar (spring term 2015) Energy Management and Sustainability

In cooperation with Prof. Dr. Michael **Opielka (Scientific Director and Managing** Director of the Institute for Futures Studie and Technology Assessment, Visiting Professor at the University of Leipzig)

Prof. Dr. Dubravko Radić

Professor of Service Management

University of Leipzig

Lecture (fall term 2014/15) Services

Seminar (spring term 2015) Service Innovatio

University of Leipzig, bachelor's course in Economics and Management Science

Prof. Dr. Dubravko Radić, Dr. Sandra Dijk und Caroline Große

Lecture & Seminar (fall term 2014/15) Pricing and Capacity Management Strategies for Services

Lecture, Seminar & Practical (spring term 2015) Service organizations and customer orientation

Seminar (spring term 2015) Current issues in service manag

University of Leipzig, master's course in ent and Econ

JProf. Dr. Lutz Maicher

Junior Professor of Technology Transfer, Friedrich Schiller University Jena

SEMINAR (fall term 2014/15 and spring term 2015) Start-Up Seminar

Friedrich Schiller University Jena, master's course in Business Management

SEMINAR (spring term 2015) Data-Driven Analysis of Competition and Technology

Friedrich Schiller University Jena, bachelor and master's courses of the School of Mathematics and Computer Science

Dr. Nizar Abdelkafi

Visiting Professor of Innovation in Electromobility **Business Models for Regional SMEs**

Leuphana University of Lüneburg

Prof. Dr. Utz Dornberger

Director of the international program SEPT (Small Enterprise Promotion and Training)

University of Leipzig

JProf. Dr. Tobias Dauth

Alfried Krupp von Bohlen und Halbach Junior Professor of International Management

HHL Leipzig Graduate School of Management

Lectures (fall term 2014/15) Problem Solving and Com

Managing Global Corporations HHL Leipzig Graduate School of Management, full-time MBA program

International Management Competencies HHL Leipzig Graduate School of Management, full-time M.Sc. progra

Cross-Cultural Management and Communication HHL Leipzig Graduate School of Management, full-time MBA program

Lectures (spring term 2015) Management Practice in Central and Eastern Europe HHL Leipzig Graduate School of Management, full-time MBA program

International Management HHL Leipzig Graduate School of Management, full-time MBA program and part-time MBA program

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Albrecht Gäbel

Dajana Trapp, Luisa Pischtschan

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Please refer to the personal profiles of the researchers on the institute's website for their publication lists.



How to reach us



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By car

From Leipzig central train station

the western entrance hall and cross *Dresden:* Leave the A14 motorway Willy-Brandt-Platz (with the green at exit 25 Leipzig-Nordost and turn area to your left). Follow Nikolaistraße left onto the B87 (Leipziger Straße for about 500 metres until it becomes / Torgauer Straße, which turns into Universitätsstraße after the junction Wurzner Straße). After about 5.5 km of Nikolaistraße and Grimmaische turn right into Lilienstraße, then after Straße. Now follow Universitätsstraße 500 metres left into Kohlgartenstraße for around 200 metres. On your and just after that take a sharp right right-hand side you will find the into Dresdner Straße, which then turns passageway to the inner courtyard of the Städtisches Kaufhaus. Go through the passageway. After about left into Augustusplatz (which then 20 metres you will see the entrance to building B on the left-hand side. Fraunhofer Center Leipzig is on the Universitätsstraße, then left into 4th floor.

into Johannisplatz and Grimmaischer Steinweg. After about 1.5 km, turn turns into Grünewaldstraße). At the next junction turn right into Schillerstraße and finally right into Neumarkt. You will find the institute in just under 200 metres on the right in the inner courtyard of the Städtisches Kaufhaus.



X

From Leipzig/Halle Airport

Leave the central station through via the A14 motorway coming from From the airport, take the S-Bahn (suburban train) number 5 or 5X towards Altenburg or Zwickau and get off at Leipzig central station. Then follow the directions above.

How to reach us



Research, Develop, Advise – on a scientific basis∎

Fraunhofer Center for International Management and Knowledge Economy

The Fraunhofer Center for International Management and Knowledge Economy develops scientifically substantiated, integrated solutions for companies and regions. Our aim is to grasp the challenges of globalization as opportunities and successfully make use of them. The application-oriented approach of the Fraunhofer researchers covers everything from capability analyses and the conception, funding and implementation of international project and business models to network activities and knowledge and technology transfer.

The institute opened its Big Data Center in 2014. It is equipped with over 220 processor cores and a storage capacity of around 450 terabytes. With this technical infrastructure and our economics expertise, our researchers at the Fraunhofer Center for International Management and Knowledge Economy are helping clients who are getting ready to digitalize their own processes and business models.

Our international and interdisciplinary team of experts pool their expertise in economic, social, political and cultural sciences in order to investigate and answer questions related to:

- knowledge and technology transfer
- corporate development in international competition
- sustainability management and infrastructure economics.

The Fraunhofer Center for Central and Eastern Europe was founded on July 17th, 2006.

On July 2nd, 2015 the institute underwent an official change of name and is now known as the Fraunhofer Center for International Management and Knowledge Economy.

On July 17th, 2016 the Fraunhofer Center in Leipzig will celebrate its 10th anniversary.