The scientific power of EffizienzCluster LogistikRuhr

Protect the environment and resources, guarantee the supply of urban systems and maintain individuality: these three social challenges define the scope of activities within the EffizienzCluster LogistikRuhr. The EffizienzCluster considers the world from this point of view and promotes logistics’ most fundamental task: to create efficiency.

Within the EffizienzCluster, more than 180 partners from research and economy are working together on logistic solutions to face the challenges of the future.

This brochure presents the German research facilities being part of our “Leading Edge Cluster” (Spitzencluster). Their interdisciplinary way of working is innovative and unique in the world of logistics. In the following, each research facility provides an overview of their most important research topics. Some of the relevant experts are listed up with their fields of activity and contact details. Thus, you can directly contact the respective partner of EffizienzCluster. Because that’s what the EffizienzCluster is all about: Opening up new possibilities to establish international strategic networks.

EffizienzCluster Management GmbH

Research Facilities – the scientific partners of EffizienzCluster

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The EffizienzCluster -
The World from a Logistics Point of View

Tomorrow’s logistics should both protect the environment and guarantee supply. It is a requirement and target for the EffizienzCluster LogistikRuhr and all projects to facilitate tomorrow’s individuality – in terms of the individual supply of goods, mobility and production – with just 75 per cent of today’s resources. The efficiency of processes and products is the key focus.

Mastering Tomorrow’s Challenges

Logistics is taking on responsibility for the challenges of the future: Science and business develop products, approaches and innovations in order to prepare society to changing conditions and, at the same time, to enable society to maintain its lifestyles. Substantially, the work of the EffizienzCluster is determined by three parameters:

- To protect the environment and resources. The limitation of resources and the hazards for ecological systems have caused a change of thinking in business and society. Within the EffizienzCluster logistics solutions and procedures are tested for increased efficiency with which the market participants can also expect to achieve a competitive advantage.

- To guarantee the supply of urban systems. The trend towards urbanization is increasing, also as a result of demographic change. More and more goods have to find their way into conurbations and city centers using infrastructures which are already stretched to the limit. The EffizienzCluster develops solutions for the flexible and resource-efficient supply of both consumers and companies within urban systems.

- To maintain society’s individuality. The diversified consumption and leisure behavior of individuals and globalization with its almost unlimited transportation of goods across borders, have led to increasing complexity for the value-adding network. The EffizienzCluster helps the market participants to fulfill consumers’ requirements.

In total, in the EffizienzCluster’s joint projects 100 innovations, products and patents are being developed that the research partners or other interested companies will be bringing onto the market, making logistics even more competitive overall. In comparison to other industries, these innovations will cause above-average growth for the stakeholders in the cluster and, subsequently, for the entire German logistics industry.

Seven key topics serve as so-called innovation corridors

Seven key topics describe the central innovation corridors within EffizienzCluster LogistikRuhr: Within these key topics innovations are created that will significantly change the face of logistics in the sense of taking on new responsibility for society. The objective is for logistics to become the determining element in value adding networks.

Various research programs are dedicated to each key topic. These include more than 40 national and international projects. Developers of key topics, working in an honorary capacity, strengthen the contents of their topics at the scientific level and connect the projects with each other. At the same time they provide for the transfer of knowledge to other key topics and give substantial impetus for the further development of the entire cluster. As qualified experts in their disciplines they also represent their key topic in professional circles and to the public in general and initiate new discussions. Their contact details can be found within this brochure.
Key topic: Changeable Logistics Systems

Logistics service providers and commercial enterprises must constantly and proactively align their value adding systems to constantly changing requirements. Changeable logistics systems create the flexibility that is needed here.

Key topic: Logistics-as-a-Service

Many planning and control processes are usually handled without undue administrative red tape rather than being pursued with IT support. This is because conventional software is too ponderous, too complex and not transparent enough. However, tailor-made IT can essentially help logistics to produce efficiency.

Key topic: Urban Supply

In 2017, more than half of the world’s population will live in urban areas. Yet, in the existing system the sustainable supply of goods and products to consumers is not guaranteed. There is demand for efficient, environmentally-friendly and resource-saving, individual and modular logistics solutions, particularly for urban areas.

Key topic: Goods Transport Management

For many years the demand for goods transportation has been increasing. Transport volumes exceed the capacity of the present traffic infrastructures. With an intelligent goods traffic management system, however, logistics can make an essential contribution to a sustainable improvement of the overall traffic situation.

Key topic: Environment in Focus

Logistics currently causes more than 14 per cent of all carbon dioxide emissions worldwide. Today, however, it is on the threshold of a green revolution: Innovative sustainable technologies, logistics systems and sustainable procurement contribute decisively to maintaining the competitiveness of companies.

Key topic: Logistics Design Competence

The economic, ecological and social challenges we have to face today mean logistics has to undergo a reorientation. In order for logistics to be in a position to play its part in solving these contemporary problems and push forward the processes of change, it has to build up logistic design competence: restructuring logistics goes hand in hand with education in logistics.

Key topic: Activation of Cluster Potentials

The formation of clusters is an important tool for actively supporting innovation. Yet, the development of innovations is not guaranteed, not even in a cluster. In fact it requires strategic and tactical management to fully exploit the potential of a cluster and to reveal the advantages of its specific success factors.

For more information about the EffizienzCluster, its Key Topics and Projects please visit our website www.effizienzcluster.de/en
Profile Since its inception in 1971, EBS European Business School has played a pioneering role among German business schools and is one of the most highly regarded business studies faculties in the country. Through academic excellence and thought leadership EBS has established a reputation as a powerful motor for business, politics and society. The expansion of the Business School into a University in 2011 is the most important milestone since the founding. Since then, the EBS University is one of the leading private universities for business and law in Germany.

Research & Practice The Institute for Supply Chain Management – Procurement and Logistics (ISCM) of the EBS Business School is the centre of a global research, education and training network for Purchasing, Logistics and Supply Chain Management. ISCM works together with renowned companies and leading Business Schools in a global network of independent teams of scientists at central locations of the global economy.

Links to EffizienzCluster The EBS participates with the ISCM in the project Sustainable Sourcing Excellence.

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Profile
The DST was founded in 1954 initially for the sole purpose of acting as a towing tank and has since developed into a broad-based development centre for inland and coastal navigation. The DST’s main focus is the development and implementation of market orientated transport concepts for inland and coastal shipping offering its services to industry and governments. The DST is associated to the University of Duisburg-Essen.

Research & Practice
The DST’s consulting services primarily focus on the efficiency and the cost advantages associated with waterborne transportation. Next to optimizing vessels and the waterway infrastructure, efficient transshipment interfaces are required. The entire transport chain needs to be taken into consideration when assessing competitiveness, i.e. the various modes of transport, transshipment procedures and (interim) storage requirements.

Various questions concerning the development potential of inland navigation as part of multimodal transport concepts were dealt with in a series of DST projects. In addition to basic studies on development trends in container transport (containers/ swap bodies), these projects for example also investigated concepts for using oversized vessels on the Rhine or for using smaller, but faster vessels to navigate tributaries and canals. Other research projects with funding from local and national governments as well as the European Union analysed topics like economic efficiency, environmental protection, safety aspects and fleet modernization. Furthermore, the DST employs a shallow water navigation simulator ‘SANDRA’, which enables basic and advanced training of on-board staff and contributes to the development of new research perspectives and activities since 2008.

Links to EffizienzCluster
The DST takes part in the research projects Organisational Innovations with Good Governance in Logistics Networks (OrGoLo) and Scientific Training and Education in the Logistics Sector (WiWeLo). Prof. Dr.-Ing. Bettar Ould el Moctar, Member of the Board of DST, is also a member of EffizienzCluster’s Scientific Committee.

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Profile
Future Logistics and service concepts need to fulfill the general sustainability requirement in order to improve the overall performance of logistics and service industries. This requires intensive research and also transfer of research results regarding change management, methods and especially education and knowledge management efforts in companies and industries. FOM ild provides state-of-the-art research and research transfer for businesses regarding high-quality and efficient logistics and service concepts and the connected education and training measures.

Research & practice
FOM ild is a leading research institute regarding new developments in logistics and service management in the fields of technological innovation (RFID, GNSS, Electric Mobility) as well as organizational developments (HR management in demographic change, logistics education and training). Therefore, a multidisciplinary team of economics, business management, information technology, marketing, international management and quality management experts work together within the research institute. The research mission is defined as cutting edge research addressing the future requirement of sustainable logistics and service management concepts – where the sustainability dimensions ecologic, economic and social responsibility are enlarged with the dimensions security and education. All five dimensions are deemed highly important for such future concepts for all service industries. Accordingly, in five research teams, scientists with backgrounds in a wide range of disciplines collaborate in projects on international, national and regional levels. Research topics in the specific project teams clustered around the research mission are:

- Economic efficiency: Operations research methods in logistics e.g. GNSS telematics applications in tour planning (GPS.LAB)
- Ecologic efficiency: Testing and implementation of future green logistics concepts e.g. Electric mobility (E-Route)
- Social responsibility: Research and outreach in responsible logistics actions such as Humanitarian Logistics (International HumLog Workshops Essen)
- Security: Contribution to international concepts in the field of dangerous goods research and training (DAGERTY with TU Istanbul)
- Education: Research regarding logistics education and knowledge management concepts e.g. “Berufswertigkeit” surveys and an Industry Qualifications Framework Logistics (IQF-L)

Within all research teams and projects, partners such as other research institutions, companies, associations and chambers of commerce are involved to increase research outcome and impact in transfer.

Links to EffizienzCluster
FOM ild participates in the research projects WIWELO and E-Route. Prof. Dr. Matthias Klumpp, Director of FOM ild, is a member of the EffizienzCluster’s Scientific Committee.

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Profile Logistics consulting by specialists: The Fraunhofer Institute for Material Flow and Logistics IML advises companies of all industries and sizes in all questions about material flow and logistics. As consultants the scientists support in fulfilling new tasks and meeting requirements, as researchers they work out new solutions together with customers, as planners they help to optimize the internal and external logistics and as developers they realize solutions in soft- and hardware.

Research & Practice The Fraunhofer IML is said to be first address for all questions with respect to holistic logistics, the employees work on all fields of internal and external logistics. At the Institute, founded in 1981, there are at the moment 190 employees as well as 250 post-graduates and students with pre-diploma, supported by colleagues in workshops, laboratories and service areas. Made-to-measure arranged teams create cross-industry and customer-specific solutions in the area of materials handling, warehouse management, supply chain management, simulation supported business and system planning and also traffic systems, closed loop economy, resources logistics, building logistics and e-business. Its research halls, test centres and laboratories provide the Fraunhofer IML with equipment for logistics research that is unique in Europe. From packaging tests through trials of the most diverse identification technologies in the most varied environments to research on swarm intelligence, IML's facilities make (almost) anything possible. Not least, the Fraunhofer IML is acting as general coordinator for the multi-institute central theme Internet of Things within the entire Fraunhofer-Gesellschaft.

Links to EffizienzCluster The Fraunhofer IML takes part in the following research projects: eBase4mobility, ePod@Home, Green Logistics, Homecare Services, Integrated Air Cargo Hub, LogisticsCampus, Logistics Mall – Cloud Computing für Logistics, Minimally Invasive Construction Projects, Multimodal Promotion, Resource-Efficient Maintenance Logistics (ResIH), Safe Networks for Logistics, Smart Reusable Transport Items, Supply Chain Design, Supply Chain Execution, Supply Chain Planning, Tray Cycling, Urban Business Navigation, Urban Retail Logistics and Cellular Transport Systems.

Prof. Dr. Michael ten Hompel, Managing Director of the Fraunhofer Institute for Material Flow and Logistics IML, is the initiator of EffizienzCluster. Also he is the Chairman of the Clusterboard and member of the EffizienzCluster’s Scientific Committee. Prof. Dr.-Ing. Uwe Clausen, Director of the Fraunhofer Institute for Material Flow and Logistics IML, is Chairman of the Scientific Committee.
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Profile Being committed to the applied research, the Fraunhofer ISST is an intermediary between science and practice: Results from fundamental research are being implemented in industrial projects – from the idea to the realization. At the same time, experiences made at the institute are flowing back into scientific research and academic teaching. The biggest potential for this purpose are our members of staff from research and administration, who provide the basis for lively personal and professional exchange, even beyond project work.

Research & Practice The Fraunhofer ISST designs standards, architectures and concepts for the development of long-term stable, complex systems within the area of information and communication technology. The service offering includes training courses, surveys, evaluations and consulting services up to design and development of IT solutions. The Fraunhofer ISST lays special emphasis on long-living and evolution-capable technologies as well as on optimal information supply via IT-technologies (Information Logistics).

Within the business unit “IT in Logistics”, the Fraunhofer ISST supports logistics companies with meeting today’s requirements and render logistics services that are competitive, customized and available on short call. On the basis of long years of experience with the modeling of business processes and the design, migration and consolidation of durable, complex systems, the Fraunhofer ISST is a professional partner of the logistics branch. The institute’s objective is to raise the efficiency of logistics solutions and therefore to enhance the competitiveness of logistics companies.

Links to EffizienzCluster The Fraunhofer ISST participates in the research projects Service Design Studio and Logistics Mall – Cloud Computing for Logistics. Prof. Dr. Jakob Rehof, Director of the Fraunhofer Institute for Software and Systems Engineering ISST, is member of the EffizienzCluster’s Scientific Committee.

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Profile The KWI promotes excellent interdisciplinary research in the humanities, social and cultural sciences and maintains close co-operations with regional, national, and international partners. It conducts basic research on the principles of modern culture with regard to relevant questions of contemporary societies. At present the Institute focuses on the thematic fields of Europe, cultural diversity of global citizenship, social responsibility, and cultural aspects of climate change. The KWI engages in civic education and outreach programs by organizing public events and co-operations with cultural institutions as well as the media.

Research & Practice Research at the KWI is focused on the overlapping main areas of research of Climate and Culture, Culture of Participation, Europe and Interculturality, which in turn are divided into individual research projects. Besides these thematic fields research at the KWI takes place in other projects in the humanities, cultural and social sciences.

Links to EffizienzCluster The KWI is partner in the research project Integrated CSR Management in Logistics Networks (CoReLo).

Contact

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The ZNU - Center for Sustainable Leadership is an applied research institute and is part of the Faculty of Economics of the University of Witten/Herdecke.

As a sustainability initiative of industry and science, we work in the fields of research, teaching, and training and conduct conferences, striving to make sustainability tangible. Our vision is to inspire today's and tomorrow's leaders with the opportunities of sustainable business management.

In order to lead organizations the way through the jungle of sustainability, the ZNU was founded as a cooperation between science and industry. Together with our partners we aim to make the issue(s) of sustainability to be within reach, feasible and credibly communicated – as well as applicable and relevant for the entire food industry. Our approach is not only scientifically grounded, but also successfully implemented in practice and provides the following relevant starting points:

- to raise awareness of current and future business leaders for the opportunities and risks of sustainability within the food sector and to enable them to implement sustainability individually and successfully
- to lead an informed dialogue with the (relevant) stakeholders and therewith ensure the credibility of the implemented sustainability activities
- to offer particularly to manufacturers and retailers a platform for cooperative (pilot) projects - as a “protected” area for creativity on neutral ground

As an academic center, it is our goal to

- be up-to-date with regard to the sustainability research for the food industry
- to bundle existing and most recent scientific findings for corporate practice
- conduct research projects to take part in the scientific foundation of the debate

The University Witten/Herdecke is partner in the research project Integrated CSR Management in Logistics Networks (CoReLo).

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Profile
TU Dortmund University has developed a unique profile with a special combination of faculty members in the natural sciences and engineering, the social sciences and the humanities. This structure produces new knowledge, methodologies and technical innovations that find their applications in the Technology Center Dortmund, which is an integral part of the campus. All this is achieved through a wide spectrum of innovative research with focal areas in production and logistics; chemical biology and biotechnology; modeling, simulation and optimization of complex systems; and youth, school and education research. Circa 31,000 students, 300 professors, 7,500 employees as well as numerous institutes and cooperation partners are shaping the future at and with TUDortmund University. The disciplines of engineering and science, the social sciences and culture studies have created a university spirit in which interdisciplinarity, interaction, communication and cooperation are not only taught, but lived and experienced. All this takes place within the scope of the university's research, in over 65 bachelor and master degree programs and in the university's extensive teacher training program, which enables students to qualify as teachers in a choice of 30 school subjects.

Research & Practice
TU Dortmund University especially supports its profile areas Production and Logistics, Chemical Biology and Biotechnology, Modeling, Simulation and Optimizing of Complex Processes and Systems and Youth, School and Education Research, where research successes are achieved on a broad basis, beyond disciplinary limits and on an outstanding international level.

TU Dortmund University has a special focus on logistics: About 70 scientists are researching and teaching at the Chair of Materials Handling and Warehousing and the Chair of Enterprise Logistics as well as at the Institute of Transport Logistics. They are complemented by the new endowed chair Supply Net Ordner Management, founded by Audi. Additional endowed professorships are planned.

Germanys' first diploma study programme in logistics has been established in 1988 at the TU Dortmund, which has outstanding importance for the scientific training and the fundamental research in logistics.

Links to EffizienzCluster
TU University Dortmund takes part in the research projects Efficiency for Logistic Facilities, eQuaL 2.0, Supply Chain Planning and LOG2020.

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Profile As a centre of excellence, the Centre for Logistics & Traffic (ZLV), an interdisciplinary and inter-divisional research and education centre of the University of Duisburg-Essen (UDE), dedicates itself to the interdisciplinary conception, management, and transfer of scientific work from across the University in the areas of logistics, mobility, and urban systems.

Research & Practice The structure and function of the economy and society have become increasingly complex with particularly strong effect on flows of materials, energy and information (logistics) as well as passenger traffic (mobility). Resulting problems place a high demand for an interdisciplinary oriented research, and education to which the Centre of Logistics & Traffic (ZLV) is committed. Relevant research areas considered by the ZLV include concepts for energy efficient transport, the application of operations research in companies, the integration of urban structures and traffic in land use planning, the creation of logistic systems for humanitarian aid, and research into the development of long-term sustainable, economically conducive, socially acceptable and ecologically reliable innovations (sustainability research). The ZLV plays also a key role in defining the profile for the University’s main research area Urban Systems.

Links to EffizienzCluster The Centre for Logistics & Traffic, University of Duisburg-Essen, takes part in the research projects Dynamics in Navigation, Dynamic Consolidation, eQuaL 2.0, Integrated CSR Management in Logistics Networks (CoReLo), Organisational Innovations with Good Governance in Logistics Networks (OrGoLo), Supply Chain Planning, Stewart Gough Platform, Tracing Intelligent Logistics Objects (TiLO) and Scientific Training and Education in the Logistics Sector (WiWeLo).

Prof. Dr. Bernd Noche, Professor for Transport Systems and Logistics, and Board Chairman of the ZLV, is Vice Chairman of the EffizienzCluster’s Scientific Committee. Further members are Prof. Dr. Michael Schreckenberg, Professor for Physics of Transport and Traffic, and Prof. Dr. Ould el Moctar, Professor for Ship Technology, Ocean Engineering, and Transport Systems.
Contact

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Mission The Wuppertal Institute undertakes research and develops models, strategies and instruments for transitions to a sustainable development at local, national and international level. Sustainability research at the Wuppertal Institute focuses on the resources, climate and energy related challenges and their relation to economy and society. Special emphasis is put on analysing and stimulating innovations that decouple economic growth and wealth from natural resource use.

Research & Practice The Wuppertal Institute’s research focuses on analysing and accompanying transitions towards a sustainable development. This type of transition research is essentially transdisciplinary. Based on concrete societal challenges and a need for change it integrates both the knowledge from different scientific disciplines and the knowledge of relevant stakeholders. In addition to generating systems knowledge, the joint production of target knowledge and transformation knowledge plays a central role in these processes. In four Research Groups, scientists with backgrounds in a wide range of disciplines collaborate in projects on international, national and regional levels. Research Groups are:

- Future Energy and Mobility Structures
- Energy, Transport and Climate Policy
- Material Flows and Resource Management
- Sustainable Production and Consumption

With the results of their respective research fields they contribute to the institute’s research agenda.

Links to EffizienzCluster The Wuppertal Institute participates in the research project Green Logistics. Prof. Dr.-Ing. Manfred Fischedick, Vice President of the Wuppertal Institute, is a member of the EffizienzCluster's Scientific Committee.

Contact

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