

Chair of Economics of Innovation and Structural Change

Topic Announcement for Master Theses

in the project

“Obstacles to Modernization in the Economy and Science of the GDR”

Mod-Block DDR

The **Chair of Economics of Innovation and Structural Change** is looking for interested students to complete their master thesis in the project *“Obstacles to Modernization in the Economy and Science of the GDR”*.

The master thesis can be written in **German or English** with regard to the following topics:

Topic 1: How does a region’s technological specialization evolve during system transformation?

Economic structures in Eastern Germany are characterized by many high-tech industries such as microelectronics and optics. These industries emerged during the 1970s in the GDR as politicians prioritized technological developments for military purposes. Today, especially Dresden and Erfurt host international leading-edge firms in the field of microelectronics such as Globalfoundries, Infineon or X-FAB that develop new-to-market innovations. However, not every region exploited this technological potential and followed other trajectories such as optics in Jena or even became locked into low-tech industries such as textiles in Chemnitz.

This master thesis seeks to investigate a region’s technological development paths from the GDR until today with the aim to extend the literature on regional specialization and technological trajectories. Patent data will be used to track technological developments in regions over time. The research question is how a region’s technological focus evolves over time and what determines this structural change?

Topic 2: What determines the establishment and change of public research institutes?

Public research institutes such as Fraunhofer or Leibnitz Institutes increased considerably in their number and reputation during the last years. Their scientific work is mostly application-oriented with a special focus on developing new technologies to transfer into the economy. Fraunhofer Institutes exist since 1949 in the Western part of Germany and increasingly emerge in East Germany that is currently marked by the largest density of public research institutes in Germany. This is not surprising given the focus in the GDR on the “Academy of Sciences”. After the system transformation in 1989, these institutes were either included in the “Blue list” on all German institutes, transformed or closed.

This master thesis aims at explaining the determinants for these institutional changes in East Germany. Which public research institutes were founded in the GDR and what is their scientific focus? On which factors did their continuation depend? The student will answer these research questions in the field of economies of science and searches for historical facts about the institutes from the “Blue list” to build a regional scientific map of institutional changes in East Germany.

Topic 3: Technology transfer from institutes into the economy: How does it work and which industries profit?

Universities and research institutes specialize in particular fields such as electrical engineering and often invent new products, spin-off their business for their commercialization and enter into new industries. For instance, TU Dresden has focused on research in the area of microelectronics in the GDR for many decades and has received many patents in this field. This research focus has positive effects on the economy and industry structures in regions such as the “Silicon Saxony” have emerged today. However, is the rise of “Silicon Saxony” a result of the technology transfer from research institutes? Which types of technology transfer exist and how do they influence the development of industry structures in a region?

This master thesis investigates the types and economic outcomes of technology transfer from universities and research institutes with a particular focus on the emergence of industry structures in selected regions. The student works with new datasets such diploma theses that were conducted in cooperation with firms.

Topic 4: Does the persistent productivity gap between East and West Germany result from insufficient research collaborations between firms and research institutes?

30 years after the fall of the Berlin wall, East Germany is still marked by a productivity gap compared to West Germany. Researchers explain this productivity gap by e.g. low levels of industrial research conducted in East German regions. Policy makers have therefore established a comprehensive research infrastructure and collaboration programs to enable joint product and technology development between firms, universities and research institutes. However, collaboration requires trust between partners that needs time to be build. During the system transformation in East Germany, economic structures changed massively and broke existing collaboration networks. The following research questions thus arise: Do former “broken networks” explain the persistent productivity gap in East Germany? How do East Germans participate in innovation networks? Is East Germany’s collaboration network smaller than that of West Germany today?

This master thesis provides an answer to these largely unexplored questions. It builds upon the literature on collaborations and innovation networks and derives hypotheses on the formation of network structures and its role for productivity in East Germany. The student uses patent data to form networks and understand their evolution and impact over time.

Topic 5: Productivity of public research institutes: Does it guarantee regional growth?

Research outputs largely differ among universities and public research institutes. Research institutes usually have scorecard systems in which outcomes such as publications or the acquisition of third-party funds play a crucial role. In parallel, firms profit from the establishment of research institutes in their region because they create and transfer new knowledge to generate new products and technologies. But do these positive externalities hold true if research institutes achieve only small research output that limits the degree of knowledge to be transferred into the economy? Is the degree of research output in turn a guarantee for a region's productivity?

This master thesis investigates the aims and research outcomes of universities and public research institutes and their importance for regional growth. The student collects publication data to proxy the productivity of public research institutes and uses labor market data to measure its influence on a region's productivity.

Topic 6: The emergence of industry structures: When do firms enter into different parts of the value chain?

The solar photovoltaics industry was East Germany's former hope for the emergence of a new high-tech industry in structurally weak regions. Policy makers therefore targeted at incentivizing new firms to enter the industry and innovate. After many core producers for solar cells and modules have established, also firms from other parts of the value chain entered the industry. However, reasons and timing of this entry, vertical integration and implications for the development of the entire industry are largely unclear. New knowledge about firms' tendencies to enter into parts of the value chain have important implications for policy makers to support the growth of high-tech industries.

This master thesis seeks to fill these gaps in the literature on industrial dynamics and the value chain by deriving hypotheses on the entry behavior into different parts of an industry's value chain. The student works with an existing dataset on the German solar photovoltaics industry and applies econometric methods to test the hypotheses and provide policy recommendations.

If you are interested in one of the topics, please contact

Mod-Block  DDR

Mrs. Ann Hipp
Postdoctoral researcher

University of Bremen
Chair of Economics of Innovation and Structural Change
Prof. Dr. Jutta Günther

Email: ann.hipp@uni-bremen.de | Phone: +49 (0)421 218-66637
Homepage: <https://www.uni-bremen.de/guenther/team/team/ann-hipp/>

Project website: <https://uni-bremen.de/mod-block-ddr>