

DFG-Network

„The Dynamics of Innovation Systems: Perspectives, Influences and Operationalization“

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By

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Title: The Dynamics of Innovation Systems: Perspectives, Influences and Operationalization**Project lead: Dr. Ann Hipp, University of Bremen****Keywords: Economics, Policy, Innovation Systems****Summary:**

Industrial nations currently face global challenges - new future-oriented technologies, climate change and international value chains shape existing system structures and require a realignment of innovation policy. Only this would allow for an increase of firms' competitive advantages, the growth of new industries and the rise of equal living conditions in regions. The literature on innovation systems examines the determinants of innovation for the growth of a system, which can be one or more economies, regions, sectors or technological units. Recent studies consider the effects of institutional influences and new technologies on the innovation capacity and the competitive edge of the actors in a system. Based on the different units of analysis, however, the diversity of systemic approaches increases, which leads to a decreasing coherence of the collective research efforts and inconsistent recommendations for policy and firms. Moreover, the majority of studies uses static and descriptive methods, which compare a number of systems at one point in time. But this impedes a measurement of the influences and the evolution of system structures. So far, methodological approaches to operationalize innovation systems and the developments therein are highly fragmented. Thus, there is a lack of analytical approaches to understand the developments and the effects of system structures and to derive coherent recommendations for action. A research exchange between the different perspectives and a knowledge transfer on the influences and their operationalization would provide a better understanding on the development and support of innovation systems. The primary research questions are as follows: How do innovation systems develop over time and are there similar trends among the different concepts? Which effects have institutional factors and new technologies on the development of innovation systems and how can they be measured? The present network bundles a comprehensive expertise on the different types of innovation systems as an economic concept and connects economists with political scientists, geographers and engineers. It consists of 18 members out of 14 institutions, among them 6 international partners from the UK, Norway, Denmark, the Netherlands and Switzerland. The project is structured in four workshops and two conferences, which are scheduled within two steps. Step 1 comprises a research exchange between the different perspectives on innovation systems. Step 2 addresses the knowledge transfer into the areas of institutions and technologies to approach the measurement of innovation system dynamics and their effects. The aim of the network is to prepare the collective scientific works and to give new impulses for advancing the concepts and methods.

Titel: Die Dynamik von Innovationssystemen: Perspektiven, Einflussnahmen und Operationalisierung**Projektleitung: Dr. Ann Hipp, Universität Bremen****Schlagwörter: Volkswirtschaftslehre, Politik, Innovationssysteme****Zusammenfassung:**

Die Industrienationen stehen vor globalen Herausforderungen - neue Zukunftstechnologien, der Klimawandel und internationale Wertschöpfungsketten verändern bestehende Systemstrukturen und erfordern eine Neuausrichtung der Innovationspolitik. Erst damit können Wettbewerbsvorteile von Unternehmen, das Wachstum von neuen Industrien und gleichwertige Lebensbedingungen in Regionen gestärkt werden. Die Literatur zu Innovationssystemen untersucht die Determinanten der Innovationskraft für das Wachstum eines Systems, worunter ein oder mehrere Volkswirtschaften, Regionen, Sektoren oder technologische Einheiten verstanden werden. Neueste Studien betrachten dabei die Wirkungen der institutionellen Einflussnahmen und neuen Technologien auf die Innovationsfähigkeit der Akteure in einem System. Ausgehend von den verschiedenen Betrachtungsebenen steigt jedoch die Diversität der systemischen Ansätze, was zu einer sinkenden Kohärenz der Forschung und inkonsistenten Handlungsempfehlungen für die Politik und Unternehmen führt. Zudem nutzt die Mehrheit der Studien statische und deskriptive Methoden, die einen Vergleich von mehreren Systemen zu einem bestimmten Zeitpunkt erfassen. Damit können jedoch die Einflussnahmen und Entwicklungen der Systemstrukturen nicht gemessen werden. Methodischen Vorgaben zur Operationalisierung von Innovationssystemen sind derzeit noch stark fragmentiert. Somit fehlen geeignete Ansätze um die Veränderung und Wirkung der Systemstrukturen erschließen und kohärente Handlungsempfehlungen ableiten zu können. Ein Forschungsaustausch zwischen den Perspektiven sowie ein Wissenstransfer über die Einflussnahmen und deren Operationalisierung würde ein besseres Verständnis über die Entwicklung und Unterstützung von Innovationssystemen bereitstellen. Die übergeordneten Forschungsfragen lauten deshalb: Wie entwickeln sich Innovationssysteme über die Zeit und gibt es ähnliche Trends zwischen den verschiedenen Ansätzen? Welche Effekte haben institutionelle Faktoren und neue Technologien auf die Entwicklung von Innovationssystemen und wie können diese gemessen werden? Das vorliegende Netzwerk bündelt eine umfangreiche Expertise zu den verschiedenen Arten von Innovationssystemen als Konzept der Ökonomie und verbindet Ökonomen mit Politologen, Geografen und Ingenieuren. Es besteht aus 18 Mitgliedern von 14 Institutionen, darunter 6 internationale Partner aus Großbritannien, Norwegen, Dänemark, den Niederlanden und der Schweiz. Das Vorhaben gliedert sich in 3 Arbeitstreffen und 2 Konferenzen, die sich über 2 Stufen erstrecken. In Stufe 1 wird ein Forschungsaustausch zwischen den Perspektiven auf Innovationssysteme vorgesehen. Stufe 2 befasst sich anschließend mit dem Wissenstransfer auf die Bereiche der Institutionen und Technologien um die Entwicklung und Effekte der Innovationssysteme abzubilden. Ziel des Netzwerks ist es die gemeinsamen wissenschaftlichen Arbeiten vorzubereiten und Impulse für die Weiterentwicklung der Konzepte und Methoden zu geben.

List of participants

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Dr. Felix Rösel

ifo Dresden (ab Oktober 2021: TU Braunschweig)

Prof. Dr. Karoline Rogge

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Prof. Dr. Michael Wyrwich

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Preliminary schedule

1st Meeting – University of Bremen April 2022 Seminarraum des IERP, Max-von-Laue-Str. 1, 28359 Bremen			
1st Day 10 am 10:30 am 11:30 am 1 pm 2:30 pm 3:30 pm 4 pm 5:30 pm 6 pm	Get together Introduction to the DFG-Network “The dynamics of innovation systems” Aims, types and characteristics of innovation systems <i>Lunch break</i> Keynote: Cristina Fernandes (University of Beira Interior, Portugal) "25 years of innovation systems research" discussion <i>Coffee break</i> Interdependencies between innovation systems Concluding discussion <i>Dinner</i>	2nd Day 9:30 am 10 am 11 am 12 pm 1:30 pm 3 pm	Get together A holistic approach of innovation systems Keynote: Alba Marino (University of Messina, Italy) "The global connectivity of regional innovation systems" discussion <i>Lunch break</i> The development of innovation systems Concluding discussion and conference preparation
1st Conference - ifh Göttingen September 2022 <u>Theme: Many approaches, one goal: How to achieve innovation in a global system</u> Invitation of network members + Open call for papers Submission of abstracts (800 words) 15 paper presentations (Day 1: 9 + Day 2: 6) in 5 sessions 20 minutes presentation, 10 minutes discussion Keynote speakers: <ul style="list-style-type: none"> • Maryann Feldman (University of North Carolina, USA): “The digital transformation of innovation” • Marko Hekkert (Utrecht University, Netherlands): „Mission-oriented innovation systems“ 		Short abstract Firms use new opportunities to innovate and to achieve a competitive advantage on global markets. The levels of globalized competition intensified over the last decades and require firms to transform their business, specialize on promising new technologies and cooperate with rivals. Moreover, the technologies developed become more complex and harder to imitate. This conference provides a platform to exchange knowledge on the dynamics of competition and new innovation approaches. Contributions from various disciplines that combine innovation dynamics and innovation systems with the geography of innovation, innovation politics, industry dynamics, evolutionary economics or technology management are very welcome.	
2nd Meeting - TU Braunschweig April 2023			
1st Day 10 am 10:30 am 12 pm 1:30 pm 2:30 pm 3 pm 4:30 pm 6 pm	Get together Determinants of the development of innovation systems <i>Lunch break</i> Keynote: Hiroyuki Okamuro (Hitotsubashi University, Japan) "Multilevel policy governance and innovation" discussion <i>Coffee break</i> The role of policy and technologies for the development of innovation systems Concluding discussion <i>Dinner</i>	2nd Day 9:30 am 10 am 11 am 12 pm 1:30 pm 3 pm	Get together Methodological approaches to operationalize innovation systems (Part I) Keynote: Simone Vannucchini (University of Sussex, UK) "A systemic perspective on socioeconomic transformation in the digital age" discussion <i>Lunch break</i> Methodological approaches to operationalize innovation systems (Part II) Concluding discussion and conference preparation

<p>2nd Conference - FSU Jena September 2023</p> <p><u>Theme: Innovation systems revised: The new role of technologies, policy and the state</u></p> <p>Invitation of network members + Open call for papers Submission of abstracts (800 words) 15 paper presentations (Day 1: 9 + Day 2: 6) in 5 sessions 20 minutes presentation, 10 minutes discussion</p> <p>Keynote speakers:</p> <ul style="list-style-type: none"> • Franco Malerba (University of Bocconi, Italy) "Catch-up and the entry strategies of latecomers" • Caroline Haeussler (Member of the Commission of Experts for Research and Innovation, Germany) "Bridging the Gap between Invention and Innovation: Increasing Success Rates in Publicly and Industry-Funded Clinical Trials" 		<p>Short abstract The role of policy for innovation and economic progress has changed dramatically. Policy does not play a passive role in fixing markets anymore; it rather shapes entrepreneurship and the innovativeness of firms, regions and entire nations in a direct manner. Through a diversity of programs, the state actively engages in the development of new products and technologies. The effects of these new policies for the innovativeness and competitiveness of firms, regions and economies is however controversially discussed. Some researchers claim negative effects such as high costs. The conference invites to submit contributions in the field of technology and innovation policy and the role of the state for presentation and discussion with an international community.</p>	
<p>3rd Meeting – University of Bremen April 2024 Seminarraum des IERP, Max-von-Laue-Str. 1, 28359 Bremen</p>			
<p>1st Day</p> <p>10 am 10:30 am 11 am 12:30 pm 2 pm 3 pm 3:30 pm 5 pm 6:30 pm</p>	<p>Get together Conference insights und progress of studies Governance of global and national innovation systems <i>Lunch break</i> Keynote: Ville-Pekka Sorsa (University of Helsinki, Finland) "The evolution of the national innovation system as programmatic policy idea" discussion <i>Coffee break</i> The role of knowledge in the dynamics of regional systems of innovation Concluding discussion <i>Dinner</i></p>	<p>2nd Day</p> <p>9:30 am 10 am 12:30 pm 2 pm 3 pm</p>	<p>Get together Dynamics of sectoral and technological innovation systems <i>Lunch break</i> Keynote: Jonathan Köhler (Fraunhofer ISI, Germany) "Advancing the analysis of technological innovation systems dynamics" discussion Network evaluation and final discussion</p>

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