

**Technology Policy and Innovation
Value Add Partnering in a Changing World**

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Review: Prof. Chandler Stolp, Ph.D. and David Gibson, Ph.D.

Text editor: Prof. James Hartzell, Ph.D.

Text processing: Ms. Katarzyna Ciach

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University of Texas - Uniwersytet Łódzki
ul. Matejki 22/26
90-237 Łódź, Poland
www.icul.uni.lodz.pl
e-mail: icul@uni.lodz.pl

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Foreword

The successful implementation of innovative practices is a key element in the path towards strengthening the role of scientific institutions in overall socio-economic development and is decisive in determining the effectiveness with which the academic environment performs this task. Innovation is accorded a leading role in the creation of economic growth; accordingly it has become an ever more important subject of scientific research. This increased interest in innovation is a result not only of the deepening knowledge regarding it and the complexity of the topic, but also reflects an appreciation of the important role it plays in determining the shape of overall social and economic development. Nurturing the culture of innovation is of special importance. Activities in this regard should focus on raising public awareness of the importance of innovation to economic development, both in terms of society as a whole as well as with regard to specific social groups engaged in the process (enterprises, universities, organs of public administration).

Innovation potential, particularly in today's era of global transformation into a knowledge society, is of fundamental significance inasmuch as the well-being of particular societies is dependent on the ability of their governments and businesses to obtain and maintain competitive advantages. It is also worthy of note that the development of innovation potential is not based on advanced technology alone, but in equal measure on human resources, education and research, professional training, management, financing, marketing, as well as on the development of appropriate policies – national, regional, educational, technological etc.

The pace of economic development is dependent on the scope and scale of innovation in economic activities as broadly understood, particularly in the small and medium sized enterprise (SME) sector.

Regional innovation strategies should provide the opportunities for enterprises, especially SMEs, to improve their innovation potential, in turn improving the innovativeness of the entire region and taking advantage of the specific competitive advantages particular to a given region. A sound regional innovation strategy should be integrated and multi-disciplinary and should take into account the interdependence of the public sector (at all levels: international, national, regional, and local) and the private sector.

Highly significant in aiding this process is enhanced cooperation between researchers, scientists, and scholars and the internationalization of the results of

scientific research on a global scale, which in turn is fundamental to the further advance of contemporary science.

The influence which scientific research and new technologies exercise on the economic development of regions is the result of a complicated process involving the participation of universities, national and local governmental organs, and representatives of business. The circulation of scientific information in the international arena is also of critical importance. This process encompasses conferences, publications, seminars, and international exchanges of views and experiences – not only at the scientific level but also within economic sectors and public administration. The within publication constitutes a concrete example of this kind of information exchange.

The main aim of this publication is the presentation of views and research results and the initiation of wide-ranging discussion concerning the role of science and technology in socio-economic development. This discussion encompasses representatives from the spheres of public administration, business, and science from a multitude of countries: Austria, Belgium, Brazil, China, Denmark, Estonia, Finland, Germany, Greece, Indonesia, Ireland, Italy, Korea, Luxemburg, Malaysia, Mexico, The Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, Ukraine, Taiwan, The United Kingdom and The United States.

In my capacity as Rector of the University of Łódź I'd like to take this opportunity to thank all the authors whose presentations are included in this work for their contributions to this valuable publication, issued on the occasion of the University of Łódź's 60th anniversary. The high quality of the articles in this publication constitutes proof of the excellent cooperation between the Innovation Center at the University of Łódź and its network of international partners. I am convinced that this cooperation will bear fruit in the near future in the form of a number of specific scientific research projects which will be of significant value to the socio-economic sphere in the broadest sense of the term.

Prof. dr hab. Wiesław Puś
Rector, University of Łódź, Poland

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The editors thank the authors of the enclosed chapters for sharing their insights and country perspectives on a main themes. We especially thank University of Łódź Rector Professor Wiesław Puś and Director of American-Polish Offset Program University of Texas at Austin University of Łódź Professor Wojciech Katner for their important and continue support to this publication. Finally the editors are especially grateful for the excellent and timely work of Professor James Hartzell, University of Łódź, Mrs. Katarzyna Ciach, Management Faculty, University of Łódź, Mrs. Agnieszka Sobczak and Mrs Aleksandra Woźnicka, Project Coordinators of Innovation Center University of Łódź for successfully bringing this volume to publication.

Introduction to Technology Policy and Innovation: Value Added Partnering in a Changing World

Wojciech J. Katner
Dariusz Trzmielak
Maciej Urbaniak
University of Łódź, Poland

Today, one of the most basic and necessary conditions for the socio-economic development of any country is the pace of its technological achievements, which impact significantly on the creation of national wealth. In order to attain a satisfactory level of achievement, it is necessary to make the necessary financial investments and to create an atmosphere of engagement in the development of new technological solutions. The fate of enterprises based on new technologies depends to a large extent on the activities they undertake to support their technological needs. In particular this concerns the synchronization of commercialization strategies with regional innovation strategies and educational policies, the latter of which must aim at enhancing the cooperation between universities and industry.

Firms which rely on advanced technologies need to develop strategies aimed at creating competitive advantages in the same manner as they develop long term investment strategies, i.e. commencing with a well-planned initial phase laying the groundwork for the commercialization of new technologies and ending with a precise marketing plan. Such firms' chances for success are based on a combination of many factors, such as the current and future productivity and efficiency of the firm and the sources underlying its position of competitive advantage.

The experience gained in the implementation of the American-Polish Offset Program of the University of Texas at Austin and the University of Łódź, begun 18 months ago, shows that one of the most valuable instruments in aiding the development of entrepreneurial innovation is the creation of international networks of cooperation. The high degree of uncertainty associated with the implementation of new technological ideas and projects renders it natural to look for cooperation partners, both domestic and international. Both formal and informal networks of contacts and cooperation are naturally created, aiding the process of industrial specialization and knowledge transfer. In addition the

increased costs associated with the introduction of new products on the market also encourages enhanced cooperation and exchanges of experience between scientific institutions, businesses, and organs of public administration engaged in the development of advanced technologies, once again at both the domestic and international levels. European integration and globalization of the economy constitute additional highly significant factors inducing the creation of cooperation networks. All of the above constitute challenges for the 'expanded Europe', the United States of America, and the so-called 'emerging economies'.

For a long period of time Polish enterprises and research institutes failed to appreciate the importance of innovation strategies. Even today the concept of 'commercialization of scientific achievements', i.e. the introduction onto the market of scientific discoveries and elaborations, remains too little understood. Yet only when the process fully encompasses scientific research activities can we talk about the success of applied science.

The slow but steady rise in interest in Poland in new technologies is an outcome of the equally cumbersome but forward moving process of liberalization of the Polish economy and the influence of advanced technologies on new and restructured Polish enterprises. In particular attention is naturally focused on new solutions which are connected with the creation of competitive advantages. The means by which enterprises identify and assess such changes, and determine the role played in them by innovation, is not without significance. Companies able to quickly and efficiently carry out the foregoing process may significantly increase their chances of success. A well-thought out educational process and the creation of a training system which facilitates knowledge transfer from academic centers to business will significantly enhance a firm's ability to take advantage of technological opportunities and to integrate itself into the circle of innovation. The behavior of economic organizations may sometimes be spontaneous or accidental, but in the era of increased and constant competition it is not possible to think about attaining positive results without taking into account both the external factors impacting on a firm (economic, legal, and social) as well as the internal possibilities for reaction and adjustment (human resources, asset portfolio, financial position etc.). Hence the need for enterprises to actively and systematically elaborate a developmental strategy using innovative solutions and changes.

In addition, the currently observed practice of transferring production facilities to those countries able to produce more at lower cost changes the role of the economy and technology production in those countries, which must continually develop to remain competitive. Technological advances and economic innovations have become a virtual necessity for the economic development of many governments and regions. This trend is visible as well in the future development prospects for Łódź and the surrounding region. It is no accident therefore that the offset technologies are located here.

The underlying idea of the within publication is to instigate discussion of the key questions concerning the roles played by science, science-industry-governmental cooperation, and technology in socio-economic development in today's world. In the era of enhanced competition the significance of achieving a proper alignment between scientific research and technological development in research institutes and enterprises is ever more apparent. In addition, the ability of firms to recognize and use knowledge capital gives them a competitive advantage in supplying products or services, even in difficult market conditions. The incubation program, which brings together the actual activities of firms, the science of commercialization of research, and advanced technologies is designed to offer firms opportunities for accelerated development and the establishment of leadership positions in particular areas of industry, all in the context of a constantly and rapidly changing economic world.

The basic aim of this publication is to make an ordered presentation of the issues selected for discussion, as follows:

1. International partnerships and new technologies (including science and technology for innovative management);
2. Infrastructure, regulation, and innovation policy (including intellectual property rights and regulatory activities);
3. Training, education, and management (including university/industry cooperation);
4. Innovation: Case studies (including technological challenges and innovation growth);
5. Specialized industrial technology and other sources of competitive advantage (including industries specializing in technology production and sources of leadership in industry);
6. Regional innovation strategies (including financing innovation and problems associated with regional development);
7. Innovation in an expanded Europe (and challenges for expanded Europe).

The international network of cooperation has already commenced, as reflected in the contributions of the many authors from various countries interested in economic innovations and the development of advanced technologies.

While the countries of the OECD and the European Union remain the major participants and sources of inspiration, the wide geographical spread of authors contributing articles to this publication makes it clear that the circle of countries and institutions which recognize the advantages to be obtained from new

technologies and solutions, and their role in attaining success, goes beyond the OECD and the European Union and is ever-widening. This trend can only be welcomed with all due respect and admiration, bringing with it the hope that subsequent forms of cooperation within the ever-widening cooperation network will continue to yield ever-increasing fruits and profits. If the offset program carried out by the University of Texas at Austin and the University of Łódź contributes in any way to strengthening this process, it can only reflect the need to continue our activities.