A TRANSFER OF MODERN TECHNOLOGIES FROM UNIVERSITIES TO SMES-ORGANISATIONAL — THE PICTURE IN POLISH MEDIA

The author of this article focuses mostly on new challenges that await particular scientific centers which create a value added as scientific researches and help out with their commercialisation. The result of this kind of outlined cooperation is creating a new quality in scientific researches area which propounds itself in a specific, practical application in different enterprises. The article presents the technology transfer in a structural approach and focuses on an institutional system that was thoroughly researched and examined from a utility and efficiency points of view. The hypothesis that was stated in principles of the article in question shows itself in an ascertainment that the transfer of technology is undoubtedly needed in universities, however for now there are no friendly law or organisational conditionings. What is more, there is a constant rivalry and mutual reluctance between universities and entrepreneurs.

A new law has been resolved and its establishments came into existence in October 2011. A new act (in its authors’ opinion) is supposed to enlarge the autonomy of academies, improve the quality of education and also hasten academic career of employees.

Keywords: transfer; technology; SMEs-organisation; Polish media; university; business-company; law; Civic Platform.

Introduction
Higher education in Poland started to rapidly develop after constitutional, political and economic changes that have been presented in 1989. It is estimated that in years from 1992 to 2009, almost 326 non-public academies came into being- together with public universities the today’s number increased to 458 academies. At first, universities functioned according to the higher education act of 1990. Alternatively, there were also used acts’ regulations from the 31.03.1965.

It emphasizes the fact that a general role of universities is upbringing and education of students as well as conducting scientific researches by the employees. Didactic and research processes happening in academies of higher education cause situations when interactions with intellectual and industrial property laws become inevitable. That is where one can see arising interactions between universities and a transfer of technology to enterprises. The fundamental research aim of this article is to present the essence of the transfer of modern technology from universities to enterprises.

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The essence and genesis
of the technology transfer
The technology transfer is a
phenomenon that very often ac-
companies innovational process-
es. A technical information flow is
its essence. Furthermore, other
authors claim that the technology
transfer focuses not only on a flow
of information, but technology
and information. Therefore, infor-
mation and knowledge have a
great meaning in this area of in-
terest. Firstly, an information about
a new technology disseminates
and then a technology knowledge
flows. D. Sachal assumes that if
a technical product is being trans-
ferred, it is accompanied by a trans-
fer of knowledge that it is based
on. What is more, another authors
claim that the technology transfer
is based on an exchange of knowl-
dge about existence and rules of
machines and devices functioning
and on an exchange of machines
and devices themselves. Moreover,
J. Malecki assumes that the
technology transfer contains all of
the forms of innovation and tech-
nical education diffusion. It is very
often a market process in which
technology is being bought and
sold. As it can be observed, in the
doctrine there is a variety of for-
mulations on the technology tran-
sfer. Generally, it can be assumed
that the technology transfer repre-
sents a transmission of technol-
ogical knowledge from scientific
centers (including universities) to
economy, so to enterprises. The
technology transfer can have a
vertical and a horizontal form [see
of illustration].

It seems that aims of the verti-
cal and horizontal technology
transfer differ from each other.
The aim of a flow of a new techno-
logical knowledge from research
institutions to industry is usually a
technical innovation, whereas the
aim of flows between companies
is basically a diffusion of innova-
tion. Therefore, making inventions
accessible by research institu-
tions or universities to enterprises
is treated as a sign of the vertical
transfer, while diffusion as the ho-

9. It usually is a principle of a technological innovation.
11. S. Radosevic, International Technology Transfer and Catch-up in Economic Deve-
The technology transfer was even present in ancient China that was way ahead of certain continents in terms of technological novelty. In time, modern technologies spread to Europe and other continents. England was one of the countries that particularly benefited from changes happening thanks to technology — the English gained many modern technological solutions.

Nowadays, the technology transfer in highly developed countries is particularly expanded and it is characterised with a quite wide variety of organisational forms. In most of the European countries and in United States, within a technology transfer system there are included universities, extramural research units, chambers of commerce and industry, economic associations, etc. However among them, science and technology parks have a special meaning.

Another form of the technology transfer are enterprises created...
by scientists or universities and enterprises that represent innovational branches of the economy\textsuperscript{19}.

The technology transfer is widespread in countries of Western Europe and also greatly in the United States. In Poland, people have only just started to learn how to lead a process of technology transfer in a correct way and what is the best method of commercialising scientific research results. In that country, the technology transfer creates some kind of reluctance, especially among older people that might not entirely understand the idea of it, the rules of functioning and potential benefits that it can bring to the country.

The technology transfer in Poland

In Polish conditions, to make processes of the technology transfer more enhanced there are created various places such as: science and technology parks, enterprise and innovation incubators and also technology transfer and innovation centers\textsuperscript{20}.

An essence of technological parks comes from the United States. It was the place where in 1948 the Bohanson Research Park has been created. There was also quite a rapid increase of development of this kind of organisations in Europe, especially in Germany where many similar institutions came into existence. A technological park is an initiated and financed by public resources economic complex that assists realisation of support of young and innovational enterprises’ politics as well as optimisation of conditions of technology transfer and research results’ commercialisation from scientific institutions to economic practice. Nowadays, there are 25 technological parks placed in Poland\textsuperscript{21}.

Enterprise incubators can be defined as separated, organising and based on immovable enterprise centers which support a development of small companies (including those recently founded) through offering a local, trainings and advice services. In that case, an incubation process is based on preincubation, so training of a young entrepreneur, elaboration of a business model, incubation including planned projects, a preparation for investing and searching for financing sources and growth of a company through a development of a team, access to assets and entry to international markets.

A typical academic incubator focuses mostly on a detailed process of incubation\textsuperscript{22}. According to


\textsuperscript{21} Including the oldest one — the Science and Technology Park in Poznań created in 1995 that runs with Foundation of Adam Mickiewicz’s University.

\textsuperscript{22} There are some generally known enterprise incubators such as: Innovation and Enterprise Center of Greater Poland in Poznań near the University of Technology, Technological Center next to the University of Technology in Gdańsk, Progress and Business Incubator in Krakow and Enterprise Center near the University of Technology in Warsaw.
the recent data, there are about
53 enterprise incubators function-
ing in Poland, in which there are
1200 working subjects making
4800 job vacancies23.

Centers of Technology Transfer and Innovation are included in
deloping with the technology transfer. Principal
aims of activities of centers in
question are: valorisation of scien-
tific and innovational potential in a
region, elaboration of pre-invest-
ment studies, identification of in-
novational needs and popularisation,
promotion and development
of technological enterprise24.

Universities of Technology have
the greatest potential in creating
Centers of Technology Transfer and Innovation.

Scientists hired in that kind of
university, by using its properties,
become authors of more than tol-
erable innovational technologies
that spread in the country and
even in the world. Hence some of
the universities’ decisions to cre-
ate Centers of Innovation and
Technology Transfer Development.
Their aim is a transfer and com-
mercialisation of scientific research
results and preventing earlier de-
scribed situations.

They are created with a pur-
pose of a practical use of universi-
ties’ intellectual potential in a
country’s economy. The closely
cooperate with a variety of institu-
tions in a process of transfer and
thanks to that they have a regular
access to technologies that are
offered and looked for. They have
knowledge about an intellectual
property security and sources of
innovation financing. Also, they
often have an appropriate poten-
tial in obtaining union’s funds and
thanks to them they can accom-
plish some expensive aims. What
is more, they make specific contact
platform for scientists, students
and entrepreneurs, they mediate
in searching for recipients for
elaborated by universities patents
and technologies. Precious parts
of activities are trainings conduct-
ed for employees and students of
universities that are related to
commercialisation of scientific
eaborations. Moreover, they give
advice and provide assistance in
an inventions’ patenting process,
they also issue opinions on inno-
vation of created technologies.

A case of functioning of these
centers seems to be particularly
important. A Polish scientists’
knowledge level and a number of
scientific publications coming into
existence in national universities is
very high. Besides that, a suc-
cessful technology transfer to
economy and drawing profits
resulting from this process will
give benefits to all interested
sides. However, it requires contin-
uation and consistency in already
started work on building the con-
sciousness and changing a way of
thinking about economic values,
potential and studies’ effects.

Organisationally, Centers of In-
novation and Technology Transfer
Development are very often staff
divisions of a rector or a chancellor

23. Z. Chyba, W. M. Grudzewski, Przedsiebiorczość akademicka w Polsce. Osiąganie
przewagi konkurencyjnej w wyniku komercjalizacji technologii, Warsaw 2011, page 82.
and they usually hire 1 to 5 employees; depending on needs, there can be also hired people for external projects only. In some Centers, their work focuses mostly on realisation of projects co-financed with European Union resources or National Center of Research and Development, hence hiring some people for projects’ needs. In spite of that, the main aim of activities of these university units is organisation of a wide contacts’ area between researches and industry. Some of the centers focus on promoting university contacts and giving them legal forms, other ones specialise in contacts with small and medium enterprises and help them to gain new technologies and professional knowledge.

Transfer’s divisions are essential elements of universities’ politics, making it possible to be more open to contacts with an economic practice and ipso facto to participate in regional activities stimulating an economic development. Through this kind of units, universities participate in creating new local incubators of modern technologies and technological parks. Centers of Innovation and Technology Transfer Development can be created in a form of university units as well as commercial law partnerships. A legislator in a new regulation related to higher education decided to give a possibility to create this type of organisations. What is more, in a present reality it seems that without this kind of institutions universities are doomed, especially if it is a university with a technological profile. However, Centers of Technology Transfer that conduct researches in a social sciences area can also be met in universities. In this case, Centers join studying and business together and they try to implement some already worked out solutions to small and medium enterprises to increase their competitive predominance.

The legislator assumes that in purpose to commercialise scientific researches’ results and a developmental work universities can create a limited liability company or a joint-stock company. Tasks of this company would include embracing shares in other limited companies or creating new companies that are appointed to implement the scientific researches’ results or the developmental work, likewise to administer the

25. The Center of Transfer and Innovation of Poznań’s Technology University hires 16 people.
26. It is based on drawing up agreements, contracts and other settlements that aim to create innovational values.
29. A procedure of creating this kind of company is based on appointing it by a rector, with a senate’s or another collegial body’s permission. It can also be a different type of companies: general partnership, limited liability partnership, limited partnership business entity or partnership limited by shares.
industrial property laws in a form of commercialisation\textsuperscript{30}. Universities can also join different companies, cooperatives or economic organisations\textsuperscript{31}. In this context, an important question reveals: can a university that creates a commercial law partnership in a form of the Center of Technology Transfer and with its help it effectuates the technology transfer and commercialisation of scientific researches operate a business? It seems that with present law regulations universities can operate a business exceeding an economic activity that is described in art. 106 of Higher Education Law.

It is also assumed that art. 7 of the law in question does not include limits on a range in which universities can operate the business. In this context, it is wise to imply that rules of operating a separated economic activity are regulations that will be used in narrowly defined economic operations of a university. The legislator transfers decisions on the issue to hands of statutes and universities’ senates regulations\textsuperscript{32}.

Hence it can be established that the Senate of a public university can appoint a commercial law partnership based on appropriate decisions of a statute. The incorporated court will be in charge of controlling a partnership creation. What is more, if operating the activity involves a disposal of permanent assets’ elements above their specified worth, to make the action come into existence will require a permission of the Ministry of State Treasury\textsuperscript{33}. Therefore, for the purpose of the technology transfer universities can create companies and other partnerships that will aim to accomplish their statutory activities and also operate businesses. It is worth to consider an access to laboratories for small and medium enterprises or a permission to conduct (paid) scientific researches on their behalf. Finally — an initiation of their own researches and their commercialisation.

\textbf{Summary}

A matter of scientific researches results’ commercialisation and technology transfer is an issue not fully explored yet in a Polish literature and practice, hence it seems that any actions undertaken by particular universities in this field will be based on experiences gained in a process of implementing new ideas. Undoubtedly, these experiences will be also gained in the way of appointing special purpose entities which will have a basic task of the commercialisation and technology transfer.

How will the public and non-public universities controlling this kind of units behave? Including

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\textsuperscript{31} Art. 62 of the Act 1 pnt. 8 of Higher Education Law.


\textsuperscript{33} It was defined in the Act of 8.08.1996 on procedures for the exercise of implementing powers conferred on the Treasury, Dz. U. (Polish Journal of Laws) no. 106, pos. 493.
the ones operating economic activities? Will scientific researchers use the proposed solutions? Finally, to what extent will the legislator’s concept be realised? It is difficult to unequivocally define it for now. It seems that the issue of commercialisation and transferring modern technologies to small and medium enterprises is an exceptional chance for universities to develop their scientific activities and also gain some financial benefits for innovational ideas coming into being in universities and being implemented in enterprises. What is more, a rigorous cooperation of a science and business sector can get them closer to worldwide standards in this field.

In this article, the author presented institutions of the technology transfer in a dynamic approach. It seems, that an ability and a quality of building partnerships, network structures and searching of a consensus are crucial elements of an evaluation and legitimacy and also partly an efficiency of institutions taking part in the technology transfer.

Therefore, a thesis that universities look for their activity fields all the time while building ever so new partnership institutions such as Academic Enterprise Incubators and Centers of Innovation and Technology Transfer Development can be stated. However, a number of these institutions is not identified with a quality. Mostly, they are directed on union’s financing and brought under logics of adjusting to application requirements.

L. Kwieciński assumed that these institutions and their provenance are related to region’s needs in an insufficient degree. There is a serious lack of specialists, qualified personnel and a permanence effect, so surviving without national or European donations. That is why these institutions require a permanent monitoring and verification of their actions. Even in spite of some negative assertions, these institutions are very much needed and also essential to develop a widely understood innovational politics that functions in European, partly national and very slowly in regional perspective.

References


Автор цієї статті приділяє особливу увагу новим викликам, які чекають на окремі наукові центри, що створюють таку специфічну додану вартість, як наукові дослідження та допомагають у їхній комерціалізації. Результатом такого роду наміченого співпраці вищих і підприємств є нова якість наукових досліджень стосовно конкретної користі для підприємства. У статті представлено процес перенесення технологій у практику та акцентовано увагу на інституційній системі, що дозволяє це робити.

Гіпотеза, викладена у цій статті, свідчить про те, що передача технологій, безумовно, потрібна для університетів, однак поки що немає відповідного закону чи організаційних умов. Понад те, існує постійне суперництво та взаємне небажання допомоги між університетами та підприємцями.
Автор цієї статті приділяє особове увагу новим викликам, які чекають окремі центри, створюючи таку специфічну додану вартість, як наукові дослідження та допомагають їх комерціалізації. Результатом цього намагається співпраці університетів та підприємств стає нове якість наукових досліджень відповідно до конкретної користі для підприємства. В статті представлено процес перенесення технологій у практику та акцентовано увагу на інституційні системи, яка дозволяє це здійснювати. Гіпотеза, змістова у цій статті, свідчить про те, що передача технологій безусловно необхідна для університетів, але на сьогодні немає відповідного закону або організаційних умов. Більше того, сущіснує постійне суперечність і взаємне нежеле зусилля між університетами і підприємцями.

Ключові слова: трансфер; технологія; SMEs-організація; польські медіа; університет; бізнес-компанія; закон; громадянська платформа.

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Надійшла до редакції 10.11.18