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United states corporate research : University of North Texas experience

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The article under consideration is devoted to the problem of organizing corporate research in a US higher learning institution. Notwithstanding vastly different experiences and opportunities of its advancement in the US and Ukraine, the issue appears to be of a paramount importance in a theoretical as well as in a practical dimension for both countries.

corporate research, financial support, government-university liaison, University-Industry corporate linkages.

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Корпоративні дослідження в американських університетах: досвід університету Північного Техасу

Стаття присвячена проблемі організації корпоративних досліджень у вищих навчальних закладах США. Незважаючи на відмінний досвід та можливості організації таких досліджень в Україні та Сполучених Штатах, ця проблема має велику теоретичну цінність та практичну значущість для обох держав.

корпоративні дослідження, фінансова підтримка, відносини «уряд – університет», корпоративні зв'язки між університетами та промисловістю

In the contemporary highly integrated and dynamically developing world new inventions are moving from university laboratories into the hands of consumers, via industry, faster and more efficiently than ever before [3]. The positive experience of the developed countries has demonstrated that only a firm and lively linkage between a research / educational institution and industry / company can bring quick and plentiful financial revenues as well as overall societal benefits that should meet the ever-growing demand of a vast majority of the world's population.

In fact, in the USA, like in most developed countries of the west, industry and academia have been collaborating for more than a century [9] with a strong institutional, legal and financial support of the Federal and State governments. Thus, in 1995 industry supported approximately 7% of total university research funding and up to 16% of research funding in the biotechnology field [4, p. 513, 520] while in 2007 the government's appropriations for Research and Development (R&D) activities totaled $137 billion plus tax benefits that gave businesses an incentive to increase their R&D spending [7].

The topic of the subsequent discussion is an efficient organization of corporate-government-university liaison while the **goal of the article** is to showcase quite a successful organizational structure of science and research in the University of North Texas where one of

the authors was privileged to conduct a short-term study within the IREX University Administration Support Project (2011).

The case method with which the analysis was carried out has permitted to delve into the smallest though momentous details crucial for the success of the entire scheme. The practical approach to studying the organization and implementation of the university-industry corporate relations is especially important since the Ukrainian academia is so far tremendously distanced from the material production. Its fruits, theoretical as well as practical, do not exercise any tangible influence upon the country's economy which conversely in the developed western countries presents a considerable percentage.

This unfavorable state of things is drawn attention to in the May 14, 2008 N 447 Resolution of the Cabinet of Ministers of Ukraine On Approval of the State Target Economic Program «Development of innovation infrastructure in Ukraine for 2009-2013», namely: «The educational and scientific potential, especially of higher education institutions is not fully used in the fields of information and communication, high technologies and informational resources for scientific, technical and economic information, including database technologies, scientific and technological achievements. There is no defined mechanism to stimulate the creation of innovative infrastructure in Ukraine» [2].

The task set in this article seems even more important on the background of quite scarce literature and internet materials that should feature the topic of the Ukrainian university-corporate research.

Such poor coverage is not accidental, but rather reflects the crude reality: on the one hand, universities have too few of cutting-edge research assets to offer to the industry, on the other, the latter has not accumulated sufficient potential to focus on the production of the newest technologies. So far, 95 % of the national industrial output is made up by metallurgical, chemical and light industries, fuel and energy complex and by most branches of engineering. On the other hand, the share of high-tech, based on electronics and computing, optical fiber technology, software, telecommunications, robotics, information services, and biotechnology does not exceed 5% . But as the example of the Tiger countries convincingly demonstrates, it is the knowledge-based economy that is able to transform a developing country into a developed one in a comparatively short period of time.

This obvious truth, nevertheless, is leaving the national top management unaffected. The policy of major constraints including those on the financial freedom of a university leads to minimizing the efforts of the institutions to invest into the development of their science while the rich government financing – both of the central and local administrations – which has been the main locomotive of developing university-industry relations in the USA, remains a daydream for our academia.

Of those scarce orders on research which universities nevertheless obtain from outside the customers are mainly the Ministry of Education and Science and local governments. Thus, in 2012 a modest sum of 469,7 ml. hryvnas has been allotted from the National Budget for conducting scientific research in higher learning establishments («Joint order of the Ministry of Education and Ministry of Finance [1]). Unfortunately, even that limited financing did not include purchase of high-tech equipment that might have updated the existing material base and substantiated further university research. A very small proportion of local authorities' orders that address regional issues (mainly in the social, humanitarian and educational spheres) estimates 4-7% of the total financing of university research in Ukraine.

To sum it up, the main problems that get in the way of creating and developing corporate university-industry research in Ukraine are as follows:

1. Today in Ukraine there are no effective mechanisms of stimulating businesses to raise funds to finance research and development (tax and credit incentives, public contracts for the firms that should cooperate with universities. etc.).

2. Universities lack practical experience in the market research services, commercialization of research results, technology transfer, sufficient resource base.

3. There are no clear mechanisms of stimulating innovation activity in Ukraine, including real support of establishment and operation of parks, venture capital funds, technology transfer centers.

In the main part of the article, in the process of describing the structure of organizing the university research on the example of the University of North Texas (Denton, USA), we are going to address some of the above issues, as well.

1. General Information About the University of North Texas

The University of North Texas, Denton, Texas, contains 163 buildings and 14 residence halls and has 36,000 current students enrolled in 97 bachelor's, 88 master's and 40 doctoral degree programs. The university awards more than 8,500 degrees a year. It prides itself on more than 300,000 alumni, many of whom are returning their bid to the University with generous donations and gifts the biggest of which in 2011 was $22 million – a part of the total $ 99 million University endowment that supported the considerable 2010-2011 budget of $858 million. The University's 720 researchers, 894 teaching fellows and assistants fulfill the main functions of the public University – to give advanced knowledge to the students, to promote the national and world science and research, to boost the local and state industry, to leverage the life of the community.

It is ranked by the Carnegie Foundation as a *Research University in the High Research Activity Category.* UNT faculty produce groundbreaking research in a wide range of disciplines within the sciences and engineering, and make nationally recognized contributions in the arts and humanities. UNT also is home to many national centers and institutes, including the Net-Centric Software and Systems Center — an NSF Industry/University Cooperative Research Center; the Semiconductor Research Corporation, Center for Electronic Materials Processing and Integration; the Institute of Applied Science; the Center for Advanced Scientific Computing and Modeling (CASCaM); the Texas Center for Digital Knowledge; and the Center for the Study of Interdisciplinarity. UNT has developed many state-of-the-art research facilities, such as the Center for Advanced Research and Technology (CART), one of the nation's most extensive facilities for powerful materials characterization and analysis; a high-performance computational facility; and a clean room/nanofabrication research facility.

In addition, UNT is developing a research park (UNT Discovery Park) with technology incubator facilities on a 290-acre property near the main campus. The university is well integrated into the fabric of the city of Denton. UNT offers classes in downtown Dallas, just 35 miles away, and is developing a Design Research Center in the heart of the Dallas design district. The university boosts the Dallas-Fort Worth economy by more than $1.3 billion each year, and UNT alumni impact the area's economy by more than $10 billion annually. The University has achieved such a high position in modern science and research largely due to the effective organization and successful development of its corporate relations with the federal and state granting organizations as well as with other universities and private corporations across the country and around the world.

2. The Organizational Structure of Research Offices

This great mission is pursued through a complex structure of UNT research offices and centers. At the highest – all-university level - it is carried out by two offices: the Office of Research and Economic Development and the Advancement Office and a few other divisions dedicated to search for donor money and collaboration with corporations. At the college level the research is concentrated in a set of College Centers. The Research Clusters rally researchers from different UNT colleges as well as invited researchers to work on some breakthrough issue of contemporary science.

2.1. The Office of Research and Economic Development

The Office of Research and Economic Development is headed by its Vice President. He is responsible for promoting the University's mission in research, original scholarship, and artistic creativity; managing IPs and technology transfer; building and developing a research park (UNT Discovery Park); and fostering partnerships with government agencies, non-profit organizations, and industry.

He moves UNT into the ranks of Tier I institutions with high level of national and international recognitions through a set of actions:

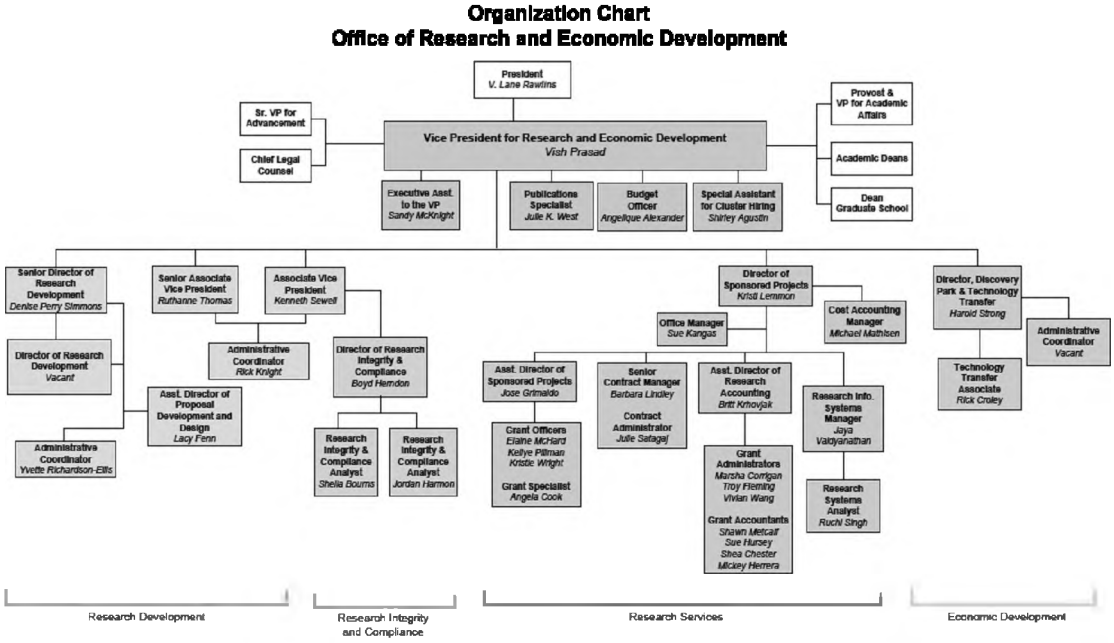
- hiring highly-accomplished senior and junior faculty;
- expansion of research infrastructure and funding;
- increase in philanthropic dollars for research;
- increase in number and quality of doctoral students;
- developing Research Cluster Program [16].

These multiple tasks are pursued through four divisions of the Office of Research and Economic Development, each with its specific functions:

Research Development

- Assist faculty with proposal preparation
- Provide research training and seminars
- Build interdisciplinary teams
- Promote development of centers and institutes
- Develop research infrastructure
- Administer seed-funding, emergency grants, and small project grants

Table № 1 – Organizational Chart: Office of Research and Economic Development



Research Integrity and Compliance

- Control integrity in the conduct of research
- Supervise adherence to Federal regulations and UNT policy and procedures
- Control export
- Submit guidelines to UNT persons conducting research

- Conduct trainings for all UNT persons conducting research [15].

Research Services

- Review, approve, and submit faculty proposals for extramural funding
- Process extramural awards
- Administer grants
- Administer research compliance and reporting activities
- Collect and report data on research activities

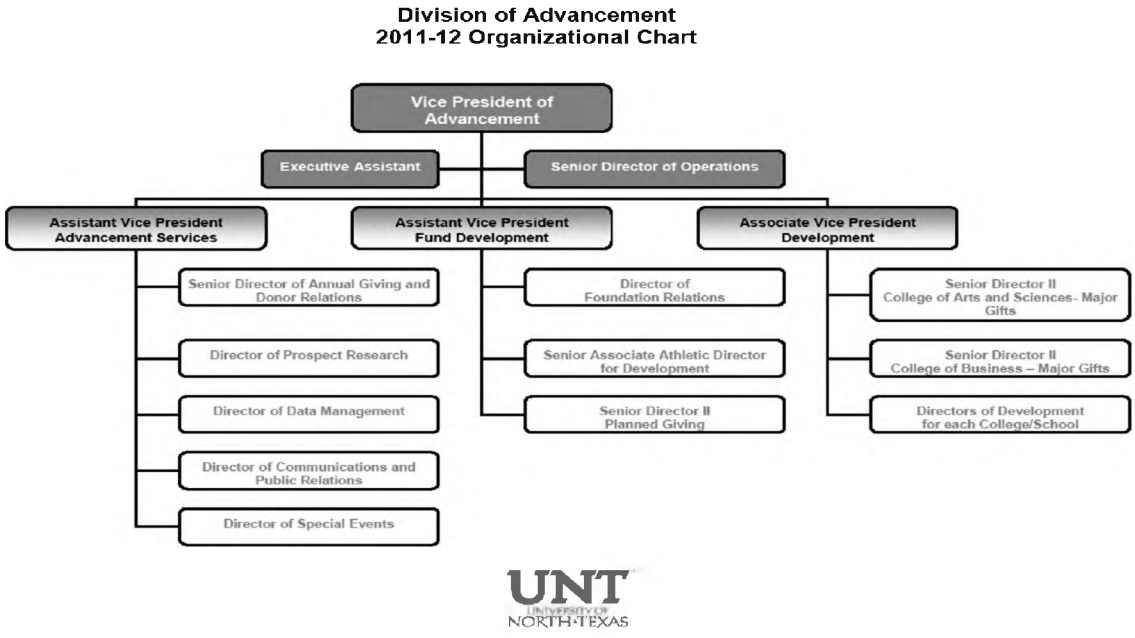
Economic Development

- Manage intellectual property
- Oversee patent and technology transfer process
- Promote commercialization through business incubators
- Coordinate interactions with local and regional government agencies and chambers for economic development
- Develop and manage UNT Discovery Park

2.2. The Advancement Office

The Vice President for University Advancement manages and oversees Advancement Operations and the offices of University Development, University Communications and Alumni Relations, as well as provides initiative, direction and oversight for the university's governmental relations activities.

Table № 2 – Division of Advancement



University Advancement

- Carry out fundraising operations,
- Generate the external recognition, support and financial resources
- Expand the institution's private support
- Work with alumni, parents, donors and the community to broaden the resources

- University Advancement carries out its mission through the following operating units:
- Alumni Association
- Development
- University Communications [14].
- It also works closely with the UNT Foundation and UNT Alumni Association. [6].
- The University of North Texas Foundation, Inc.
- Accept, invest and/or manage private gifts, endowed funds and other assets
- Support and encourage philanthropic gifts to the University.

Office of Development

- Manage philanthropic giving, usually by individual donors, alumni or friends of UNT [8].

Corporate and Foundation Relations (CFR)

- Identify corporate and private foundations that offer funding for UNT projects
- Support research, education, diversity, health, community service, economic, environmental and arts initiatives at UNT (sent by Heather Rozell, Director, Foundation Relations)

COBA Corporate Relations Office

- Network with corporate representatives, alumni, and the community to form partnerships in producing co-oops, internships, career placement, scholarships and research opportunities within COBA.
- Promote the services, programs, curriculum and research that COBA provides to North Texas corporations and communities as well as the students, staff, faculty and the UNT campus [5].

2.3. Centers and Institutes: Organized Research and Service Units

The research activities are also done in 68 UNT Centers and Institutes that mostly function within the Colleges as the bed seeds of college research. Centers usually consist of a 3-5 of faculty, often from within the same department or college, focusing on a specific and distinguishable theme, an area of intellectual (teaching and research) or service activity.

Centers are required to show, by review and approval of the college and Provost Office, how they are unique, and often, how they will become self-sustaining within five years. There is a wide range of funding models, and many if not most centers are not self-sustaining in 5 years. If they do not perform well, they are removed from the centers list.

Institutes are, in effect large Centers, consisting of between 5-25 affiliates or members, many could be from off campus or across the university. Some are created, not from centers, but after a grant award, such as the IUCRC (Industry-University Cooperative Research Centers, a program funded by the US government through the National Science Foundation that takes innovative new research relevant to a cross section of U.S. economic competitiveness (e.g., cloud computing) and creates a university-corporate partnership where research priorities are driven by companies and universities.

2.4. Clusters as the Centers of Corporate Research

As part of the implementation of the research plan, UNT has created fifteen research clusters [13] which are collaborative, cross-disciplinary teams composed of leading researchers, faculty, students, and institutions. Clusters engage faculty from a wide range of disciplines-from fine arts, humanities, and education to sciences, engineering, and business. The clusters are focused on attracting nationally and internationally recognized scholars, mostly at senior level. They are:

1. Bio/Nano-Photonics.
2. Complex Logistics Systems.

3. Computational Chemical Biology.
4. Consumer Experiences in Digital Environments.
5. Developmental Integrative Biology.
6. Hazards and Disaster Research to Respond to Global Crises.
7. Human Security, Democracy, and Global Development.
8. Initiative for Advanced Research in Technology and the Arts.
9. Knowledge Discovery from Digital Information.
10. Materials Modeling.
11. Multi-scale Surface Science and Engineering.
12. Renewable Bioproduct.
13. Renewable Energy and Conservation.
14. Signaling Mechanisms in Plants.
15. Sub-Antarctic Ecosystems and Biocultural Conservation.

Cluster can lead to the development of Centers or institutes, and may position the research in such a way as to make the university more successful in attracting funding from corporate, foundation or federal sources.

3. UNT Research Emphasis

In its research UNT concentrates on cutting-edge, groundbreaking issues, such as:

Next Generation Technologies

- cyber-security and web-archiving
- advanced materials for aerospace, biomedical, and nano-devices and applications
- micro/nano-devices and systems for electronic, medical, and environmental applications

advanced technology and the arts

Sustainable Endeavors

- renewable energy
- plant sciences and bioproducts

conservation, environment, and sustainability

Human-Decision-Making

- disaster and emergency management
- logistics and decision sciences

cognitive and behavioral neuroscience

Human Health

- developmental physiology and genetics
- medical informatics
- imaging for medical, bio-identification, and geographical applications
- pharmacology
- music and physical health
- forensic science
- biomedical engineering including biomechanics

Synergistic Catalysts

- computational science and engineering
- human-machine interaction, communication, and design
- STEM education.

Kinds of UNT University-Industry Corporate Linkages

By scale, corporate research in UNT is cross-department, cross-national and international. The collaborating entities may be: individual researches, departments, universities, institutions other than educational and industries. Regarding the typical kinds of industry-university linkages, Dr. Richard H.Nader, UNT Interim Vice Provost for International Affairs, says the following:

UNT is fairly successful in (1) Informal contacts; (2) Internships; (3) Recruitment at first degree or masters level; (4) Publications; (5) Conferences; (6) Problem-solving / consulting by university staff, whereby faculty have relationships with industry as consultants or by conferences and joint publications. Usually this entails working at those industries or national labs during the summer on projects with researchers at industrial sites. Some of these develop into more formal exchanges of faculty and students, and there is federal funding available through the National Science Foundation Grant Opportunities for Academic Liaison with Industry (NSF GOALI) program to help defray these costs of placing faculty at industry or industry researchers at universities (and graduate students) and support research that otherwise would be too far upstream (away from the market) to compel industry to pay for it.

For philanthropy (gifts by industry to the university) a first step is almost always that industry seeks to recruit graduates for the workplace. Two salient examples of (7) Innovation-related expenditure spent on university-related activities at UNT include the CEMPI SRC (Center for Electronic Materials Processing and Integration the Semiconductor Research Corporation) [12] and the Industry & University Cooperative Research Centers (I/UCRC).

A CRADA Cooperative Research and Development Agreements is an example of (8) Joint research and development projects, the goal of which is to rapidly commercialize a set of technologies. Not currently at UNT.

We do have 2 examples of (9) Testing and standards. One is the NuconSteel example in Engineering (a fully integrated designer and manufacturer of total framing solutions addressing both commercial and residential markets.) [11]. The other is the PFI (Partnership for Innovation) which takes a technology and places it after a couple years of research into the product testing phase according to industry standards. Much of the industry standard setting is done by the US National Institute for Standards and Technology (NIST) [10]. NIST offers some grants and partners with some universities to accomplish their goals.

(10) Recruitment at post-doctoral level happens when industry or universities need to fill an expertise gap within a specific project funded by industry. (11) Exclusive licensing of University-held patents and (12) Non-exclusive licensing of University-held patents are when the university has protected the intellectual property (patent) and is exercising its right to license the technology to a company for a fee. The university owns the technology and allows revenues from the license to flow back in part to the faculty member. The (AUTM) Association for University Technology Managers was the key professional organization that develops this type of IP and technology licensing process. UNT also plays the other roles that pertain to its functions of a research-educational institution.

Thus, corporate research of an US University is financed through government-university liaison, University-Industry corporate linkages, numerous state and private grants and philanthropy. Governmental policies strongly affect the potential supply of research and technological inputs from universities. To a lesser degree, they also impinge on the demand for the services available from universities. But the decision to establish links ultimately rests with the firms themselves. Philanthropic sources often fund endeavors that no one else is ready to fund because they do not offer the right return-of-investment perspectives. An increasing share of this funding is going into life sciences.

The recent experience regarding the interaction between firms and universities is quite mixed. Though firms are more aware of the gains in competitiveness from innovation and are sensitive to the high returns from research and development, much of this outlay is by large companies. Meanwhile, in the interests of reducing costs, tapping a wider range of disciplines, canvassing a variety of technological options, and spurring multiple competing research initiatives, firms, whatever their size, are moving toward open innovation practices.

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Корпоративні дослідження в американських університетах: досвід Університету Північного Техасу

Стаття присвячена проблемі організації корпоративних досліджень у вищих навчальних закладах США. Незважаючи на абсолютно різні досвід і можливості його просування в США і Україні, питання має першорядне значення в теоретичній, так і в практичній площинах для обох країн.

У практиці економічно розвинених країн термін "корпоративні зв'язки" означає зв'язки між вищими навчальними закладами й компаніями чи корпораціями у сфері наукового дослідження та практичного застосування його результатів.

Зрозуміло, що вживаність слів відображає реалії життя: якщо в кожному американському університеті існують відділи, що виконують функції просування корпоративних досліджень, то у практиці більшості українських вишів така діяльність перебуває в зародковому стані. Основною усталеною формою співпраці між більшістю українських ВНЗ та зовнішніми структурами є дослідження на замовлення органів центральної чи регіональної влади і лише мізерний відсоток (близько 1 %) складають прибутки від досліджень, запропонованих підприємствами.

Не дивно, що й коефіцієнт впровадження результатів наукових досліджень і розробок в Україні, на відміну від середніх 80 % у США, значно менший. Тож цілком актуальним видається питання розвитку вітчизняних корпоративних досліджень. У пошуках шляхів виконання таких глобальних завдань у статті ми звертаємося до американського досвіду розбудови корпоративних стосунків.

Як приклад наводиться досвід досить успішної організаційної структури наукових досліджень в Університеті Північного Техасу (УПТ, м. Дентон, США), де один з авторів був удостоєний честі провести короткострокове дослідження за Програмою підтримки адміністрування університетів (UASP), яка координується Радою міжнародних наукових досліджень та обмінів (IREX, Вашингтон, США).

УПТ має дослідницький парк, до структури якого входить декілька десятків сучасно обладнаних науково-дослідних лабораторій. Супровід виконання сумісних наукових розробок на всіх етапах (від пошуку потенційних замовників проекту до промислової реалізації його результатів і захисту авторських прав науковців) забезпечує офіс науково-економічного розвитку зі штатом більше 100 співробітників.

В статті детально розписана організаційна структура офісу науково-економічного розвитку та функції основних його підрозділів. Хотілося б, щоб позитивний досвід закордонних колег зацікавив українських відповідальних осіб та допоміг нам створити ефективний баланс між теорією, якою багата наша вітчизняна наука, та її практичним застосуванням.

корпоративные исследования, финансовая поддержка, отношения «правительство – университет», корпоративные связи между университетами и промышленностью

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Вартісноорієнтоване управління діяльністю квазікорпоративної сукупності конкуруючих підприємств регіону

Статтю присвячено вивченню можливості застосування, з метою оцінки результативності і розробки універсальних підходів до стратегічного управління діяльністю сукупності конкуруючих підприємств агропромислового комплексу регіону, методів управління квазікорпоративною діяльністю. Методика базується на застосуванні прийомів розрахунку оцінних показників розвитку господарського комплексу за концепцією нарощування його економічної вартості

управління розвитком регіону, фактори формування вартості агропромислових підприємств, методи розрахунку економічної вартості квазікорпоративного об'єднання підприємств регіону

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Стоимостно-ориентированное управление деятельностью квазикорпоративной совокупности конкурирующих предприятий региона