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TEBD TURKEY-EU BUSINESS DIALOGUE

Turkey-EU
Business Dialogue

Transfer of the Best Applications through Structural Dialog in Capacity Increase in Digitalization, Industry-University Collaboration and Internalization

University - Industry Collaboration
Need Analysis/Workshop Report

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1.Oturum (150 dakika)
Üniversite-Sanayi İş Birliği (ÜSİ) Mevcut Durum Analizi (50 dakika)
• Akademinin sanayiden beklentileri nelerdir? (10 dakika)
• Sanayicinin akademiden beklentileri nelerdir? (10 dakika)
• Ülkemizin Ar-Ge'deki mevcut ekosistem anlayışını değerlendiriniz. (10 dakika)
• ÜSİ'nin etkinliğinde mevcut ve potansiyel problemler nelerdir? (10 dakika)
• ÜSİ'de temel paydaşlar kimlerdir? Paydaşların Ar-Ge fonları, araştırmacılar, yatırımcılar ve bilgi kaynaklarına erişimini değerlendiriniz. (10 dakika)


İSTANBUL SANAYİ O
ISO Üyelerinin Sektörel Dağılımı
ISO Üyelerinin Çalışan Sayısına Göre Dağılımı


Üniversite Sanayi İşbirliği Çalıştayı

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1.1 Current Status Analysis of University - Industry Collaboration

1.1.1. Expectations of Academy from Industry

Findings both put forward the behaviors of the industrialists that disrupting UIC from the Academy perspective and show the proposed solutions to overcome such negative aspects. Fishbone analysis regarding the negative behaviors that the industrialists show for UIC effectiveness and their reasons specified by the participants within this scope is shown in the Figure 1.

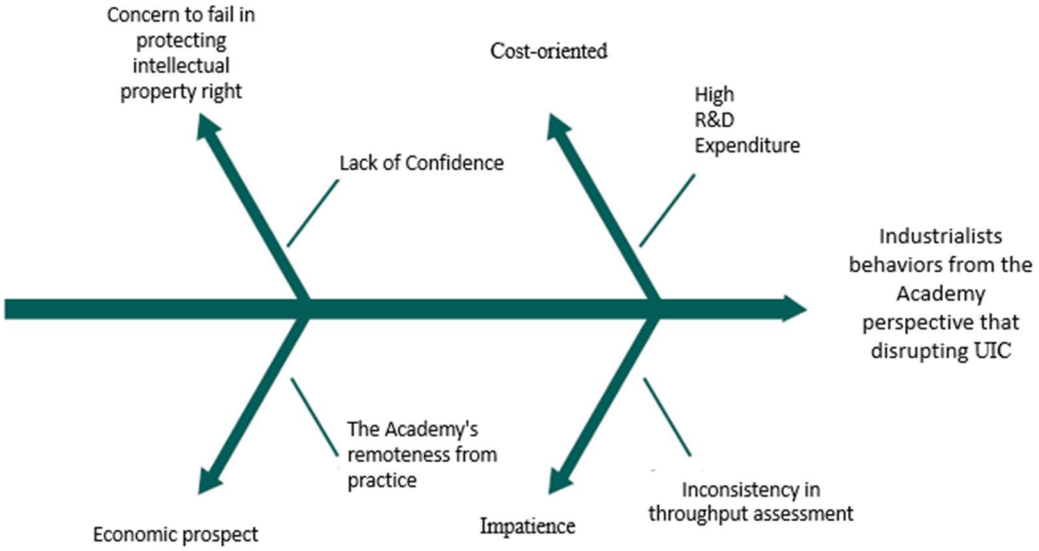

Figure 1 Fishbone Analysis of Industrialist Behavior from the Academy Perspective

"Cost-oriented" refers to the behavior of the industrialist to assess the collaborations with the expectation of transforming into a product within a short time period instead of considering such collaborations as a process of knowledge accumulation because of the high R&D expenditures.

"Impatience" is caused by the fact that the industrialist competes with the time and

refers to prioritizing fast, effective, and efficient solutions accordingly. In the light of the findings, since this impatience shown by the industrialist against the time does not match with the general professional logic of academicians, it can be concluded that the effectiveness of UIC is interrupted.

Economic prospect is related to the perception of the industrialist that academy does not show awareness for their problems and expectations; and results in the industrialist believing that the study issues of academicians are not in compliance with their financial objectives.

Concern to fail in protecting intellectual property rights refers that industrialist cannot perform a transparent collaboration understanding with the fear that their ideas might be stolen.

Solution suggestions for the reasons are shown in the Figure 2.

Table 1: Expectations of Academy from Industry

Activating of Corporate Identities of TTOs
- ✓ Creating an environment where academic knowledge and industrial knowledge are combined and harmonized
- ✓ Eliminating concerns about intellectual property rights as an observer/consultant at any stage of the cooperation process
- ✓ Acquaintance meetings

Industrialist' sharing their technical infrastructure facilities for academic use
- ✓ Laboratories, ateliers, machines etc.

Considering academy as the source of knowledge and provided with financial support by the industrialist
- ✓ Grants, sponsorship, raw materials, laboratory, application areas; providing scholarships to graduate and doctoral students for their research; and other financial supports

Providing Awareness on Difference between P&D and R&D
- ✓ Industrialists allocate funds from equity for R&D

Industrialist's access to the campuses and establish R&D centers in Technoparks
- ✓ The continuation of the collaborations as a permanent system rather than a limited time and number of works like a project

Education and Employment Opportunities
- ✓ Employment of people with doctorate degree in R&D
- ✓ Impact on syllabus

Activating of Corporate Identities of TTOs refers to the fact that TTOs serve as interfaces in the UIC activity. As an interface, the duty of TTOs is to enable university TTOs to be brought together on a mutual platform instead of leaving academy and industrialists on

their own to meet with their own efforts, and to enable industrialist to inform the academy on the new technologies and guide the studies. In other words, it is necessary to establish an environment where academic knowledge and industrial knowledge will be combined and harmonized, and the highest responsibility falls on the shoulders of TTOs. In this regard, acquaintance meetings should be organized between the academy and the industry, various organizations and actors should be brought together. Furthermore, TTOs will serve as observers/consultants at any and every stage of the cooperation process with their experts and will especially be able to overcome concerns about the protection of intellectual rights.

Academicians are intended to utilize the technical infrastructure facilities of the industrial companies. They state that the industrialists should reach them with specific issues and deem the academy as the source of knowledge. Therefore, the financial value deserved as the source of knowledge is underlined to be provided. Monetary value refers to the support that will strengthen the financial structure required for the studies of the academicians. Such supports include providing raw materials, laboratories, application areas and scholarships for graduate and doctoral students for their studies and, other financial supports.

Industrialists are expected to establish R&D centers in the universities and Technoparks of the universities. So, it will be enabled that the collaboration will continue as a permanent system rather than studies with limited duration or numbers.

Other expectations are listed as organizing more common projects, creating education and employment opportunities for students, employing more people with academic career in the industry (with a doctorate), guiding the business world in the course curriculum and including more practical life-related subjects and application examples, in addition to providing awareness between P&D and R&D, and not benefiting only from the funds of the supporting organizations by allocating funds from the equity of the industrialists for high-budget requiring activities such as R&D.

1.1.2. Expectations of Industry from Academy

The expectations of the industry from the academy are classified under the following titles:

- Focusing on priority areas by academy's following the official policies which direct the industry, and creating prototype studies that can be productized within this framework,

- Enabling academy to get rid of introversion and learn about industrial processes, gaining practical experiences and prioritizing the commercial product understanding,

- Generalizing the central laboratory practice in universities, increasing the number of accredited laboratories, paying attention to the calibration and verification of the devices used

- Allowing universities to create their own academic data bases, accessing to the details of academicians' research areas, publications, and projects,

- Establishing Technoparks in universities and enabling academicians to conduct collaboration studies with the Technoparks, adopting TTOs as a part of universities and allowing marketers and business developers to manage them,

- Prioritizing the training of qualified interface staff, including practical learning into the syllabus in addition to theoretical information.

- Reducing long bureaucratic procedures such as assignment.

1.1.3. Current R&D Ecosystem Approach of Turkey

- **Why R&D ecosystem is not effective in Turkey?**

- Despite of the structures such as R&D centers, Technoparks, universities, TTO, OSBs, the failure to establish an organic connection between them results in not being able to create an ecosystem understanding. It is important that small and medium-sized enterprises are included in the business more, evaluating their potential and integrating them into these structures.

- Giving priority to basic research and overlooking other field developments causes a lack of multidisciplinary studies.

- It is remarkable that the diversity of funding supports increases complexity and usage of funding supports has become a main goal rather than using them as a tool to produce valuable projects.

- Considering R&D system as unreliable, highly risky, and costly, and failure in showing adequate interest in the university research result in the industry focus on P&D instead of R&D.

- In Turkey, R&D initiative is considered as benefiting from incentives and exemptions by industrialists; in this context, P&D studies are prevented to be transformed into R&D.

- The regulations between the university and the state on R&D do not comply and overlap with each other. Therefore, the regulation should be restructured to cover the parties, to be flexible and supportive; and the gaps should be filled.

- Failure in creating the enough awareness on the protection of intellectual property rights results in companies to keep their know-how within themselves and not be ready for a close collaboration.

- It is difficult to find stakeholders that will take risks for R&D investment. The first reason of it is the weak communication between the industrialists and other stakeholders in R&D, and the ineffectiveness of mutual communication.

- R&D should be universalized within the intentional criteria. Due to this reason, international practices should be examined more closely and followed continuously.

- It is observed that a common language cannot be developed among stakeholders in terms of R&D and related concepts. That is why a conceptual clarity on R&D should be created in Turkey.

- Industrial employees should be encouraged to have a doctorate education and degree, and the interest of doctorate holders in industry should be increased.

1.1.4. Current and Potential Issues of UIC in Activity

Issues that have negative effects on UIC are expressed by the participants as in Figure 2.

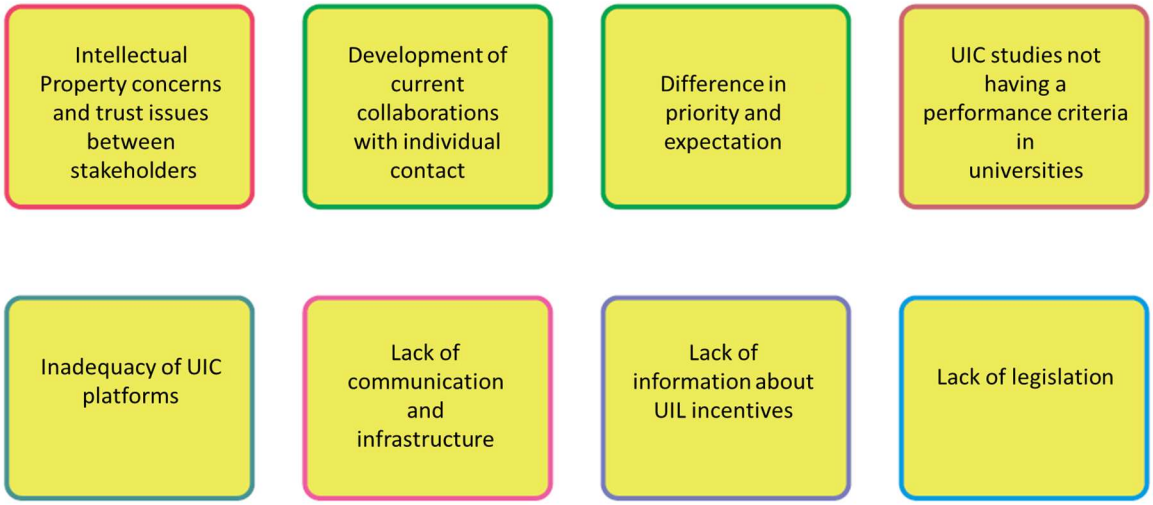

Figure 2: Current and Potential Issues in UIC

Solution suggestions for the problems are listed as follows:

- The process of transforming patents that are created in universities into business models is not adequate. The state should support the commercialization process of patents.
- The parties should be enabled to have a mindset to take the risk of failure in projects, to consider unsuccessful projects as experience and to deem the output as an example for the future studies.
- It is of great importance to include articles to protect the parties in the contracts entered by and between the parties for the protection of intellectual rights, and to allow this process to be managed by structures that can create UIC platform like TTO.
- Performance criteria should be determined where the industrial objectives are set such as academicians conducting minimum one UIC project in the universities on annual basis. For example, the outputs of theses in the USA are for the sector and the results are included in the applications. The reason behind is that academics and universities are in collaboration with the industry and their mutual communication is strong.
- Academicians should be divided into groups as researchers or lecturers.
- It is sufficient for academicians to publish their publications in quality journals. So, studies that has a minor impact on industrialization and R&D are carried out. In this context, the impact of companies on universities should be further increased.

- Graduation projects and theses should be carried out jointly with companies of structures such as Technopark and OSBs.

1.1.5. Key Stakeholders and Their R&D Funds in UIC, Researchers, Investors and Access to the Knowledge Sources

Assessments of stakeholders on R&D funds, and their access to researchers, investors and information sources are summarized as follows:

- Stakeholders can be accessed but several difficulties are experienced in using effectively. For example, restrictions on confidential legislation on access to information may cause problems in the transfer of information to each other.

- R&D funds cannot be distributed in an adequate and effective.

- Any problem is not experienced in accessing to the knowledge sources; however, interfaces are needed in universities to draw and evaluate projects.

- It should be facilitated for university staff to do business outside (for example, incentives for circulating capital reductions).

- It is of a significant problem that some public databases are open only on a project basis and some of them are kept completely closed. It results in conducting R&D studies without being aware of the current situation of the technology.

- Several insufficiencies are present in the knowledge acquisition, sharing and adaptation of industry and university stakeholders in national and international projects. Industrialists should organize trainings within their own organization regarding project designation and expert staff should be procured from outside the company if necessary.

- More companies apply on their behalf to national and international projects. This field should be participated with university participation.

- The industry has insufficient knowledge about the work done at the university. It is important to establish information sharing platforms between universities and industrialists and transform into a common platform rather than individual universities.

- Undergraduate students should be encouraged to industry collaborations and become stakeholders. Access to information should be increased with the institutionalization of TTOs.

- Patents that are created in the universities should be complying and shared with the industrialist.

Figure 3 Main Stakeholders

1.2 UIC Process Management and Improvement

1.2.1. Policy Instruments to Enhance Innovation and Entrepreneurship in Universities

The suggestions for this scope are as follows:

- Clusters should be established for a multidisciplinary structure in UIC stakeholders.
- Strategic and action plans should be created for TTOs aside from university. Academicians should be grouped as lecturer and researcher, and strategies to focus on practical activities should be developed.
- Students and academicians should be enabled to spend more time in the industry (involvement of students in the industry application as well as in project designation in the studies conducted in collaboration with the university and industry).

- The whole education process should be updated in a structure that supports entrepreneurship and innovation.

- Environments (competitions, etc.) should be created where universities are able to produce ideas that can be applied in real life and turn them into projects. It should be ensured that industry and universities are brought together and make assessments in environments where best practices, best theses and best projects are assessed.

- The performance indicators of organizations, party to UIC should be inspected and effective sanctions should be imposed for low performance.

- Academic human resources in universities should be transformed into a structure open to innovation and suitable for establishing and developing collaboration with the industry.

- Theses of graduate and postgraduate students should be prepared as subtitles for the industrialist. Studies in research universities should be harmonized with the industry.

- Incentives (material/moral) for innovative initiatives of academics in academic promotion are insufficient; therefore, incentives should be restructured and improved.

- Output analysis is overlooked since more input analysis are conducted for innovation and entrepreneurship. In this context, the inspection criteria should be checked through the inspection.

- The number of the companies that can patent and commercialize the inputs produced by universities is not adequate. It results in missing the quality patents as well.

- Regulations that allow students to participate in entrepreneurship should be developed within the university and innovative environment should be created. Students who can take risks and take initiatives in innovative subjects should be trained.

- Road maps should be created based on the commercialization analysis of the university patents and theses.

- Entrepreneurship index criteria should be made more transparent (methodology, etc.)

- Entrepreneurship projects should be conducted within Anatolia.

1.2.2. Process Management in Commercialization of Knowledge and Business Ideas of Entrepreneurs in Universities

Participants underlined the current problems regarding process management:

- There are some uncertainties in the definition of patent and common property right; on the other hand, there is not a common opinion in this regard. There are deficiencies caused by the difference in expectations in the implementation phase. Also, confidentiality contract does not have a legal basis.

- Since intellectual property rights are very new in terms of legislation, sufficient implementation in practice have not experienced yet. Practical applications should be developed.

- Policies determined regarding the wage policy have some uncertainties and insufficiencies.

- Both procedural and practical problems are experienced in the data management activity. The current situation cannot prevent brain drain. A mature structure that will support the knowledge accumulation of universities and business ideas of entrepreneurs within the ecosystem could not be obtained yet.

- The most important problem in commercialization is the wrong product definition and the absence of special units of TTOs that perform needs and market analysis.

Participants have also put forward suggestions to improve the current situation on UIC processes and bureaucracy, wage policy and data management and intellectual property sharing methods.

- Organizations such as TTO, Technopark, and chambers of industry have great importance to enable UIC processes to process in a more efficient way. Environments where opinion holders (students or academicians) and practitioners (industry) will come together with the opinion holders should be created by such organizations; and opinion holders should be provided with trainings on the processes and with consultation services.

- Training should be provided regarding the protection of trademark, patent and intellectual property rights and methods of sharing; and academicians and students should be informed about such points through workshops etc. It is of importance to protect the financial and moral gain of the academician (such as the application of premiums) and to increase the provisions received for publications and patents especially in the process of commercialization of the patents of academicians.

- Bureaucratic obstacles should be minimized, and all processes should be made more specific, planned, and transparent.

- Specialists on intellectual property rights should be involved in the processes.
- Platforms on information sharing should be established.
- While regulations are drafted, both parties' opinions should be taken.
- Fund providing processes should be facilitated.
- University patent portfolios should be created, and the regulation on intellectual rights should be revised in line with the expectations of the parties.
- Wage policies should be determined by the added value of the project.
- UIC processes should be defined on TTO in the academy.
- Patent representatives should be recruited for technical sciences and legal processes in TTOs to conduct the assessment process of intellectual property rights in correct way.
- Joint doctoral theses and projects should be carried out with the industry.

1.2.3. Business Development Strategies and Models in UIC

Suggestions on business development strategies and models based on the findings are listed as follows:

- TTO should be planned and structured to support the parties during the whole process and business development strategy should be created on TTO. Specialization should also be provided in TTOs. TTOs should regularly conduct industry needs analysis.
- Specialization should be provided in universities, industrialists should establish business development offices in universities, and universities should also have offices in industrial zones. In this way, a healthy information flow will be established and maintained.
- Organizations such as techno-day should be organized at universities and awareness should be created in the industry.
- UIC should be deemed as one of the criteria for academic promotion and appointment in universities.
- Patent portfolio should be created at universities. People with doctorate degree who can interpret and apply academic outputs in the industry should be employed in the industry.

- Academy and industry-based needs analysis should be conducted, and strategies should be developed based on needs.
- Platforms where the needs of industrialists and specialties of the academy are involved should be created to match the right people between UIC stakeholders.
- A process where the needs of the industry will be met as quickly as possible should be structured (Contract templates, fast assignment processes etc.); and this structure should be transparent and accountable.
- Strategies should be developed as win-win oriented, innovative and technology based.

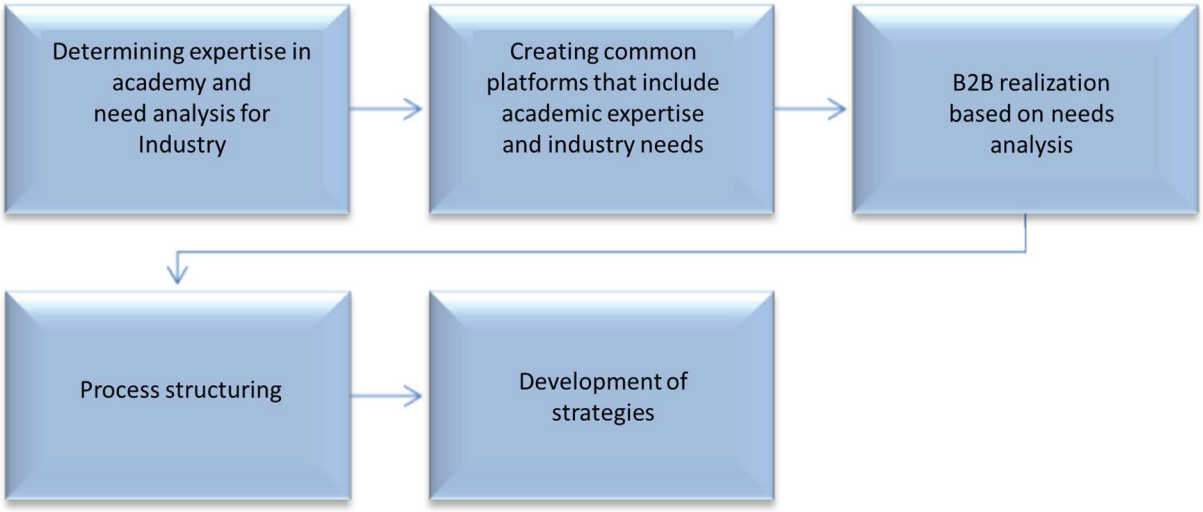

Figure 4: Set of Steps for Business Development

1.2.4. Provided the Entrepreneurship Ecosystem into a More Efficient Structure

- Integration of social-human-based entrepreneurship and science-health-engineering-based entrepreneurship should be provided.
- Studies should be realized as cross functional and multidisciplinary ideas should be produced.
- Ideas of entrepreneurs should be attached importance, communication channels by which experience transfer is possible should be established, environment of trust should be established and maintained, and moral values should be protected.
- Entrepreneurship in areas which are subject of the life itself should also be cared for and supported in addition to the matters and strategies linked to the national policy.

- The entrepreneurship ecosystem should reach a structure that supports sustainable and innovative applications that include all industrial groups.

- Applications should be initiated to make 17 sustainability development objectives accepted by UN General Assembly in 2015 (responsible consumption and production, innovation and infrastructure in industry, decent work and economic growth, accessible and clean energy, partnerships for goals, quality education, gender equality) become enforceable in the government, university and industry collaboration as well.

- Additive (3D) manufacturing technologies replace subtractive production (machining) in the international arena. So, industry and university collaboration in Turkey should be facilitated and accelerated. Projects for producing critical raw materials should be prioritized.

- Entrepreneurship processes should be conducted on TTO like UIC processes. TTOs should make mentor choices that can especially guide start-ups. Therefore, a connection with alumni associations and career centers should be established and maintained.

- The industrialists should adopt open innovation and develop their infrastructure.

- Also, entrepreneurship, open knowledge, open innovation concepts should be integrated into education curriculum. Economic policies should support the fully competitive market, sector-based policies, and strategies in compliance with the policies should be specified.

- Industrialists should create a vision to collaborate with entrepreneurs and start-ups. Chambers of industry and commerce should be used more effectively and organize trainings in this regard.

- Intellectual property awareness should be set in the protection of key information and the government should specify the limits in this matter.

- There are not real angel investors because healthy data cannot be accessed regarding the results of such investments.

- Stronger mechanisms should be developed to explore and develop real entrepreneurs with innovative solutions instead of organizations such as events-meetings.

- The concept of entrepreneurial university should be better defined.

- Business models and concepts regarding entrepreneurship should be better studied and understood.

THE SECOND SESSION

2.1. Creation of Collaboration and Conspire with UIC Stakeholder

2.1.1. Enhancing the Connection between University, Industry, Government, and Innovation Users

Suggestions to enhance the connection between quadruple helix stakeholders are summarized under three titles in Table 2.

Table 2: Development of Quadruple Helix Collaboration

Joint Activities
Face to face events should be organized. Call conferences should be realized in thematic titles. Periodical meetings should be conducted. Industrial consultation boards and joint commissions should be created in universities.
Academic Applications
Thematic universities should be created. Internship periods of undergraduate students in industry should be increased and support mechanisms should be established. Platforms containing the specialty of academicians should be established (such as ARBİS). Current portals should be enabled to be used effectively and kept updated. Programs such as 2244 industry doctorate program should be better introduced. Technoparks should be cooperated. Organizations such as techno-day should be organized.
Business Models
Industry-specific pyramid business models should be created specifically for the industry (new structures regarding the multi-disciplinary fields such as Biotechnology might be developed). Demands on governmental polices should have university-industry basis (engine power). Thanks to the regional meetings, public and private sector should be brought together, and public policies should be guided. University and industry apply for similar funds to realize innovation. More flexible funding and support mechanisms need to be established for major-scaled projects. For example, cancer and mobile research are considered in the same status and their financial budgets are the same. However, they should not be considered as the same. A communication unit should be established in R&D universities and important industrial sites and joint studies should be carried out with the university. Specialists in business facilities are required to work as partial lecturer. This contribution is of importance to increase the flow of information and transfer the knowledge of the industry to the students. The number of employees with doctorate degree in the industry should be increased.

2.1.2. Increasing the Activity of Technoparks in the Development of UIC

- Technoparks realize long-term leases (10-year contracts). However, long term leases do not include proceedings. Report cards should be issued for companies and the lease contract should be drawn and entered in line with their performances. Briefly, report cards should be prepared based on their performances.

- Technoparks should move away from the identity of only supporting the software developer and attach importance to R&D for production. Also, the Technoparks should not be considered as revenue-gaining mechanisms for the universities, and they should have a format by which the industry will provide atelier laboratory and R&D departments.

- Sectoral clusters should be realized in Technoparks and university-industry collaboration should be deemed as a performance criterion.

- Technoparks should introduce themselves better. They should introduce themselves to the industry by specifying their difference from the other Technoparks and their specialties.

- Technoparks should exchange information with both academics and industry. Technoparks should have an identity beyond only leasing and control.

- University industry joint research centers should be established.

- Leading companies should be involved in Technoparks and serve as locomotives; and the opportunity should be provided to collaborate with start-ups and other initiatives.

- The number of design-focused studies should be increased. Technoparks should have areas that will provide minor-scaled research opportunities.

- Adjustments should be realized to expand the laboratory areas in Technoparks.

- Firms and universities should use their resources collectively.

- Technoparks should be able to fund themselves and diversify their income.

2.1.3. UIC mechanisms and solutions to develop and strengthen the mechanisms

Human resource-based suggestions are listed below:

- New technologies should be enabled to come to the forefront (communication technologies). It should be following the business principles of the new generation. Digital platforms should be used more effectively.

- UICs should first train qualified people who can especially operate their mechanisms. They should train individuals that can meet the industrial needs of the country like R&D and provide trainings in this regard. The educational background of the trainer is of importance as well (people in TTOs.)

- Post-graduation training programs should be constantly used. For example, the concept of lifelong learning in Japan should be adapted to Turkey.

The solutions that are expected from the government are listed below:

- Government's having a domestic-foreign market objective for the industry and making such objectives traced effectively.

- Public's being the first customer in particular sectors (car manufacturing, pharmaceutical sector, etc.) and providing financial support,

- Determining localization policies through regulations drawn by the government.

2.1.4. Pre-Competitive Collaboration Mechanisms Between Industrial Enterprises, Technology Suppliers and Other Stakeholders

- Universities, government and private institutions are technology suppliers of each other. However, some problems that cause this relation not to be performed in a healthy way draw attention:

- The state does not apply to universities for the first technology it needs. To illustrate, this awareness should be adopted in prioritized sectors such as the defense industry. The current situation should be researched by the universities firstly, instead of purchasing such technologies by spending money. Studies conducted on health in the last few years should be initiated in other sectors.

- Inter industrial technology transfer is not present yet. It should be provided but firstly the open innovation should be supported. It is necessary to know who can get what from whom at certain points. The part up to the key information is important to be open in this regard.

- In order to establish a pre-competition cooperation, transdisciplinary studies should be supported.

- Cluster ecosystems should be created and funds to enhance this collaboration should be increased.

- Stakeholders should be provided with the discipline of project management (budget/scope/time management).

- Technologies developed at universities should be transferred to industrial enterprises through TTO.

- Standardization should be ensured through TSI in the commercialization phase, and a budget should be allocated accordingly.

- Firms with different specialties should be brought together for high budget projects, but their specialties should be guaranteed through protective contracts; in this way, trust-based collaborations should be established.

- Organizations such as MUSIAD and TUSIAD should support the umbrella firms.

- Programs like 1004 and SAYEM should be generalized.

2.2.1. The role of UIC in National Technology Move of Turkish Industry

It is of crucial importance to realize UIC in an effective way in the success of National Technology Move. For UIC to proceed within the framework of this policy, the suggestions might be classified under three titles.

Adopting the awareness of nationalization

- The awareness of "putting forward national products out of fundamental research" should be adopted in the universities.
- Content of the national technology move should be transferred correctly, and awareness increase studies should be realized in prioritized areas.
- The dependence on foreign raw materials should be reduced by using national raw material resources.
- Interfaces, human resources, and a capability inventory should be created in accordance with the official national technology policy.

Stakeholder Activity

- Universities should conduct research effectively in the production of raw materials, which is required to be transformed into high value-added products together with the industrialist. The government should support this process.
- Industrial R&D studies should be conducted.
- Within the scope of 2244 Industry Doctorate program, university-industry projects should be encouraged and supported by the government. Regulation-based uncertainties should be eliminated.
- Central communication platforms should be established. To illustrate, sectoral announcement channels should be increased within the scope of Ministry of Science and Technology.

Fund Support

- Nationalization in defense industry has approached 60%. The significantly high fund transfers to the defense industry played a key role in this success. Localization should be increased by increasing the fund mechanisms in different fields.

- The government should categorize the industrialist in funding and be more selective.

2.2.2. The role of UIC in Cluster Ecosystem

- UIC closely follows the industrial problems and the academic studies and will contribute effectively to the process of drawing the technological road maps. The steps to be taken are listed below in this regard:

- Policies of the prioritized fields should be specified with UIC and such policies should be transformed to the technological development strategic objectives.

- Even if the strategies to enable stakeholders to meet their objectives change, the objectives should be determined as long term. Public policies should be maintained as independent on the political changes.

- For the prospective sustainability of the initiated operations and projects, a knowledge memory should be created within the scope of trainer-learner relation and have a structure to be transferable to the next teams.

- Thematic structuring of the UIC is of importance. Because communication and clustering are facilitated through the thematic structuring.

- Clusters should be distinctive and simple. The methodology of specifying the clusters boundaries should be determined, and the subject diversity should be clear.

- Stakeholders that are suitable for the objective should be selected and each stakeholder should have specialty in their fields. They should be suitable for teamwork. Instead of group work, teamwork should be attached importance. The common language definition should be made for UIC in terminological sense. Because the concept of UIC is known to be considered different based on the specialty fields of the universities. To illustrate, UIC perceptions of technical universities and educational universities are different.

- Bureaucracy should be reduced for successful clustering.

- Representatives of the industrialists should be competent, original and initiative.

- There is a need for fast access to information. Information needs of both industrialists and academicians should be met.

2.2.3. The function of UIC in Increasing the Research and Development Competency Capacity of Turkish Industry

Precautions should be taken in order for UIC to contribute to the development of the

R&D competency capacity of Turkish industry. Such precautions are summarized by the participants as follows:

- The mechanisms, funds and regulations that are necessary for UIC should be used more effectively.
- UIC audit mechanisms should be developed.
- Doctorate studies should be supported in terms of time and efforts.
- Long-term internship programs (such as 6 months private-6 months public internships) should be made compulsory at universities.
- Postgraduate educations of graduate employees recruited should be supported by the firms.
- To increase the number of employees with doctorate degree, public policies should be enriched.
- Mechanisms that support students to get close to the industry should be increased (such as TÜBİTAK 2209B and 2244).
- Policies should be made as to have a positive driving effect on the firms conducting R&D.
- Industrialists should attend classes at universities. Thematic master's programs should be created.
- Collaboration should be established between industrialists and Ministry of National Education institutions. Technical high schools should be supported to train students suitable for the industry.
- Graduation thesis and projects should be carried out within the scope of UIC.
- Industrialists should be able to apply to the universities and have the topics that they have chosen be researched, and the outputs should be given as lectures in the universities to be considered as current resources and integrated into the education system. University programs of the industry should be supported.

2.2.4. Roles of UIC Stakeholders in Regional Development, Employment and Branding

- Participants have expressed that regional development, employment and branding will develop because of the following steps:
- Regional industrial focuses and regional universities' specialization in the target focus should be carried out.

- University campuses should be organized in line with the regional development targets.

- Organizations that are parties to UIC should comply with international quality standards in technology production and establish branding objectives.

- Formal evaluation criteria should be prevented to be more important than the competency evaluation criteria in project or entrepreneurship activities in public organizations.

- Regional collaborations should be thematic, and the UIC that is suitable for the resources of each region should be positioned. Thematic conferences should be organized, and outputs of each organization should be specified. Seminars on employment and branding where the outputs of the cooperation are discussed should be organized.

- Common communication platforms and channels should be established.

- Localization demands in employment should be transmitted to the universities. In this way, the universities will be enabled to be aware of the regional focusing subjects and problems. For example, a device which is required for R&D will be able to be demanded from the university and produced instead of purchasing from abroad.

- Project supports should include commercialization and even branding after the R&D result. Because the developed products cannot get to the commercialization stage. Commercialization comes first, branding comes next. First, global demand should be investigated in detail and its commercialization potential should be clarified. Also, the fund contributions should be increased for the commercialization. SMEs should be enabled to support the branding process upon the consultation services provided by non-governmental organizations such as ICI (ISO) or specialists of universities on TTO. TTOs should serve as a mediate and establish a connection between the company that is intended to be branded, and the expert.

- The university should train human resources by considering the needs of the industry in terms of employment.

- Effective and qualified personnel should be trained. In this regard, regional development offices should be more effective.

- The projects of development agencies should be more accessible.