Interreg
EUROPEAN UNION
Balkan-Mediterranean
BALKANMED E-BP

BalkanMed
E-Business Pages

Technology Transfer Guide – Cyprus

Limassol Chamber of Commerce and Industry – Limassol, Cyprus

HRDA
εεδε
hellenic management association
LIMASSOL CHAMBER OF COMMERCE AND INDUSTRY
since 1962
CCP

Interreg
EUROPEAN UNION
Balkan-Mediterranean
BalkanMed e-BP

Deliverable 4.3.4

"Technology Transfer e-guide for Cyprus"

Produced on Behalf of

PP3 Limassol Chamber of Commerce & Industry

By

Acorido Ltd

April 2019

Project co-funded by the European Union and National Funds of the participating countries

Contents

Summary

Technology transfer is defined as any mechanism by which technology, in the broadest sense, is transferred from a donor carrier to a recipient carrier. The ways in which technology transfer is implemented are many as there are various mechanisms, possible interfaces and applications. Transfer of Knowledge and Technology has been an ever-present practice for businesses across all economic sectors as a tool to promote and improveInnovation. This is reflected more than ever in contemporary EU policies and strategies for economic growth, and specifically in the Europe 2020 strategy.

However, for this approach to succeed, it is required to be promoted via a mixture of measures meeting the needs of entrepreneurship, finance, user needs and market opportunities, as every link should be strengthened in the innovation chain. Another important element to support the transfer of Technology and the overall goals of smart specialization is the development of innovation supporting mechanisms. These include business incubators, accelerators, technological/scientific parks, innovation clusters, innovation platforms, and any other similar means, that can bring together research institutions, businesses and public authorities.

The main incentives behind decisions for technology acquisition will vary according to the special needs of each actor, in most cases though they can be expected to relate to Limited Capacity for in-house development, Cost of development means and R&D risks. Its main forms include Licensing, Support Contract, Joint Venture, and Franchising among others, that include various levels of support and coordination. Technology and Knowledge Transfer can have benefits, but also present challenges, in cases that the activity has not been thoroughly prepared and preliminarily assessed.

IP rights for technology transfer, stand in the epicenter of the challenges for every local ecosystem, as their proper protection is a mend or break element for the providers of technology. In the case of Cyprus, this can be considered as one of its major strongpoints, mostly due to recent legislative efforts, that provides for a modern and attractive framework. The general framework for Technology Transfer mechanisms on the other hand still has obvious problems linked to bureaucracy and a plethora of involved institutions and authorities without clear coordinating body, as identified in numerous relevant reports. The

study is concluded with a practical session regarding technology transfer focusing on step by step approach on identification, negotiation and its implementation, that can be used to prevent the challenges presented, both general context and in Cyprus in particular, that is followed by the presentation of Cyprus' main TT facilities and institutions. Finally, the Guide's Recommendations merge the presented information and effectively link it to the governmental commitments found in the Cyprus National Policy Statement on Innovation and Entrepreneurship, focusing on education, governmental processes, business and financial support.

Introduction

Technology transfer is defined as any mechanism by which technology, in the broadest sense, is transferred from a donor carrier to a recipient carrier. The ways in which technology transfer is implemented are many as there are various mechanisms, possible interfaces and applications.

Mechanisms such as product design and production, application of concepts, production methodologies, use of know-how even by recruiting skilled human resources from one business to licensing of patent rights are mentioned. Providers of technology are usually research centres, laboratories, innovation centres, inventors, and even other companies with developed technology that they want to exploit commercially.

The great importance of these mechanisms for businesses is due to the fact that they are a fast and relatively low-cost technology acquisition mechanism that is very critical, especially for small and medium-sized enterprises that support their competitive advantage in innovation. These businesses need technology transfer to keep pace with ever-accelerating technological advances and competition at the international level, often with strong innovative activity, have advantages stemming from their flexible organizational form but lacking in science and skilled technical staff.Many studies have shown that the survival and success of these businesses are based on their ability to assimilate technology. It is obvious that as a process the transfer of technology is not a fixed and recurring mechanism but is best described with the network model that includes all possible interconnections and alternative mechanisms that must be developed and used by an enterprise to succeed in Technology Transfer.

1. Technologyand KnowledgeTransfer: Context and Links to the Business Environment

Transfer of Knowledge and Technology has been an ever-present practice for businesses across all economic sectors as a tool to promote and improveInnovation. This is reflected more than ever in contemporary EU policies and strategies for economic growth, and specifically in the Europe 2020 strategy.

Europe 2020 is the EU's growth and jobs strategy for the current decade, that is supposed to address structural weaknesses at the regional level and at the same time stimulate EU market competitiveness. The vision is founded on three mutually reinforcing priorities, which aim at a smart growth, based on knowledge and innovation, sustainable development, based on the sustainable management of available resources for a green and competitive economy, andInclusive growth, based on high employment rates, through the strengthening of economic, social and territorial cohesion.The final objective is to deliver high levels of employment, productivity and social cohesion in the Member States while reducing the impact on the natural environment.

In order to achieve the abovementioned, the EU has adopted eight targets in the areas of employment, research and development (R&D), climate change and energy, education and poverty reduction, to be reached by 2020, translated into national targets to reflect the varying situation in each Member State and its potential in contributing towards the common goal. Progress monitoring is achieved via a set of nine headline indicators and additional sub-indicators gives an overview of how far the EU is from reaching its overall targets.

Regarding of knowledge and technology transfer, these are for the most part reflected through the issue of investment in digital technologies, and in particular on how to increase the connectivity and ICT skills of businesses and citizens, and the free movement of knowledge between science and business.

Flagship Initiatives include the connectivity related 'Digital Agenda for Europe', which contributes to the smart growth priority to boost citizens and businesses' access to broadband; the ICT skills-relating 'Agenda for new skills and jobs', which facilitates the inclusive growth priority, supporting the improvement of e-skill levels in the labour force and the creation of jobs in the ICT sector overall; and the 'Innovation Union'flagship initiative on the European Research Area foroptimizing the circulation, access to and transfer of scientific knowledge including via digital ERA.

Of particular importance for the present study is the transit towards a Smart growth, meaning an economy based on knowledge and innovation, in which knowledge and innovation are the drivers for future growth. This requires improving the quality of

education, strengthening research performance, promoting innovation and knowledge transfer throughout the Union, making full use of information and communication technologies and ensuring that innovative ideas can be turned into new products and services that create growth, quality jobs and help address European and global societal challenges.

However, for this approach to succeed, it is required to be promoted via a mixture of measures meeting the needs of entrepreneurship, finance, user needs and market opportunities, as every link should be strengthened in the innovation chain, from 'blue sky' research to commercialization.

Movingintothesame direction is also the implementation of smart specialization in the context of Europe 2020, especially at the regional level. As it has been highlighted by the European Council, the importance of the concept of smart specialization cannot be overstated as it allows each region to rely on its own strengths and to set priorities for national and regional innovation strategies and for cross-border cooperation wherever possible. Smartspecializationstrategies need to be adapted to regional needs as they areanimportant means for creating synergies between the EU funded research programmes (such as Horizon 2020) and Structural Funds to improve capacity building, as R&D and innovation are key policy components of the Europe 2020 strategy.

Finally, an important element to support the transfer of Technology and the overall goals of smart specialization is the development of innovation supporting mechanisms. These include business incubators, accelerators, technological/scientific parks, innovation clusters, innovation platforms, and any other similar means, that can bring together research institutions, businesses and public authorities.

The framework described above provides the general context (in which technology and knowledge transfer take place. Regarding technology transfer itself, while it is not easy to provide a solid definition given the fluidity of procedures involved (described in the next section), working definitions refer both on the assignment of technological intellectual property, developed and generated in one place, to another through legal means and on the process of converting scientific and technological advances into marketable goods or services. In that sense, it involves commercial issues regarding the rights acquired by third

parties (be these persons, businesses, or even states) to use already existing technology in new applications and research relating issues regarding the transformation of scientific knowledge to products or services of a specific application. This means that any technology transfer facilitation is a hybrid procedure of legal and market support, scientific capacity building and research policy advocacy. Therefore, it is important that it includes all parts of the innovation helix as shown in figure 1 below, linking Research, Innovation and Entrepreneurship together with the issues of Research, Innovation and Technological Development under the umbrella of Entrepreneurship issues. As a result, Technology Transfer is an essential innovative entrepreneurial activity and high-tech entrepreneurship, as an integral part of the value chain that is intended to be created in the national innovation system of Cyprus.

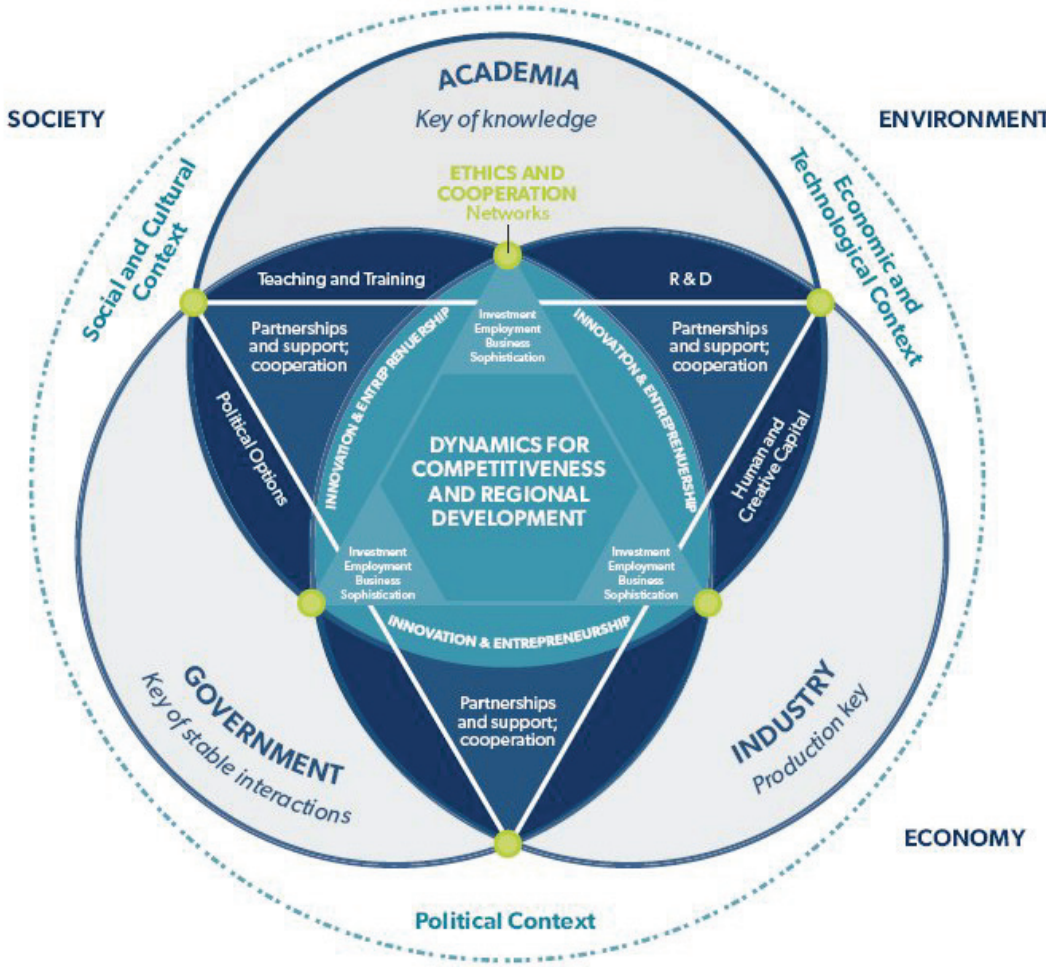

Figure 1 Triple Helix Triangulation Model (Farinha & Ferreira)

Following the terminology used in the Innovate Cyprus report (2015), the term "Entrepreneurship" in the present study will includethe development and adoption of any form of innovation by enterprises, the development of new start-ups, the creation of spin-off / spin-out spin- from Universities, Research Institutes and existing businesses for commercial exploitation of research results, exploitation of Intellectual Property Rights through licensing, consultancy services for transfer of know-how limit, etc. (Innovate Cyprus, 2015). Accordingly, the same activities will be assessed regarding their Technology Transfer capacity and as to their eventual impact on the evaluation of the Entrepreneurial Framework Conditions of the Global Entrepreneurship Monitor analysis regarding the period 2017-18 (using 2018 data) in financing, government policies, taxes and bureaucracy, government programs, school-level entrepreneurship education and training, post-school entrepreneurship education and training, R&D transfer, access to commercial and professional infrastructure internal market dynamics and market openness, and social and cultural norms. Cyprus standings in the latest report are shown in the figure below.

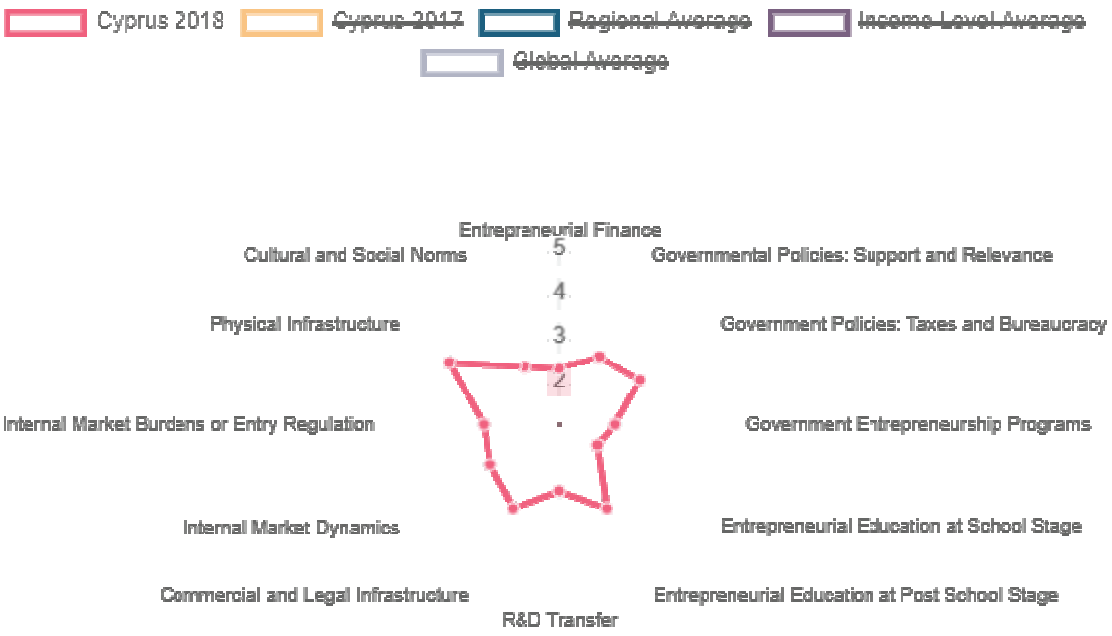

Figure 2 Cyprus Entrepreneurial Framework Conditions 2018

2. Technology and Knowledge Transfer: Type, Benefits and Risks

2.1 Types of Technology and Knowledge Transfer

Technology transfer is a key point for expanding actors (businesses, networks, research institutions and public authorities to name a few) in the continuous process of innovation, as it is required to unlock the potential for growth and development. The main incentives behind decisions for technology acquisition will vary according to the special needs of each actor, in most cases though they can be expected to relate to one of the following themes:

- Limited Capacity for in-house development, meaning that the interested actors don't have capacities, experts or R&D experience in a particular field to develop an in-house technology[1];
- Cost of development means that in some cases even if a company has required recourses, it could be more expensive to develop new in-house technology rather than to acquire it externally;
- R&D Risks that are commonly associated with the development of new technology. Even in the case of large investments, new and innovative results are not guaranteed while transfer allows getting a commercially proven technology;
- The necessity of Acquisition of new technologies, e.g. the emergence of new breakthrough technology in the market, the lack of which would lead to competitive disadvantages;
- Linked to the previous, the need for faster than possible in-house development.

Continuous innovation is a crucial component of today's business development, especially in the EU smart economy context. At the same time, the complexity of new technologies and the speed of innovation no longer allow interested parties to rely upon internal R&D resources, creating the nee, along with the development of the internal innovative environment, to use technology transfer as a mechanism of external sourcing of innovations.

[1] *In-house refers to conducting an activity or operation within a company, instead of relying on outsourcing. This occurs when a firm uses its own employees and time to keep a division or business activity, such as financing or brokering, in-house.*

The exact form that the Technology or Knowledge Transfer will take, is also subject to individual conditions and needs of the business or other institution involved. The most common types of transfer are described in the following sections. At this point, it has to be noted that the use of one type of transfer scheme, does not exclude the simultaneous use of other schemes terms and that technology transfer can apply in local or international agreements and cooperation schemes.

2.1.1 Licensing

Licensing is an agreement under which the owner of a patent, trademark or other intellectual property gives permission to another company to use the technology developed by him (her), in a certain area during a certain period of time. It can grant exclusive rights or non-exclusive rights and include sublicensing clauses. Licensing usually carries lower costs compared to other TT methods; however, it requires an already existing in-house capacity for further technology implementation.

2.1.2 Support Contract

According to this agreement, the technology owner participates in the technology implementation, providing at each stage of the transfer technical support, as well as personnel training. As the original developer continues to participate in the operations, the cooperation level between the two parts is higher.

2.1.3 Joint Venture

A joint venture is an agreement concluded between two or more companies in order to execute a particular business. The joint venture implies mutual assets, management, risks, profit sharing, co-production, services and marketing. Benefits can include thelong-term cooperation between the parties, motivation of all participants in the successful transfer and lower costs than individual R&D activities. Disadvantages of joint ventures are often associated with the different vision and goals of both partners, their inability to be independent in management and the potential difficulties in objective determination of capital value provided by each partner.

2.1.4 Franchising

Franchising is an agreement where one company grants to another the right to use its trademark and business model, to produce goods and services according to the seller’s

specification. Normally, the owner of a trademark also shares its experience in operating and managing the franchised product.

On the plus side of a franchising agreement, the buyer acquires and uses a ready brand, a proven business model, knowledge in management and marketing. The negative aspects lie with the dependence of the buyers on the franchising owner and the limitations that can be imposed upon them.

2.1.5 Strategic Alliance

A strategic alliance agreement is usually concluded between two or more large size companies in order to use specific skills of each of them in the development of new innovative technologies. A strategic alliance could be in the form of joint laboratories, research programs, production and promotion of a new product.

2.1.6 Turnkey Agreement

In turnkey agreements, the general contractor is responsible for all the procedures related to technology transfer, such as technology design, financing, equipment supply, construction and commissioning.

2.1.7 EquipmentAcquisition

Refers to the Acquisition of Equipment with the main disadvantage the limitation to mere technical knowledge incorporatedin the equipment, excluding any management and production elements. Moreover, equipment generally available on the market does providea unique privilege to the buyer.

2.1.8 Management Contract

Technology transferred through competent experts. Advantages include the small cost of TT. The downside of this transfer form is the limited applicability (small scale projects of relatively simple technology).

2.1.9 Foreign Company Acquisition

A company may acquire a foreign startup which is developing new technology. As a result, the company will not only get the technology, but also a team capable to develop it in the future. Moreover, the acquisition of a foreign firm automatically places the company in the new international market.

2.1.10 Direct Foreign Investments

Applicable at the state level, direct foreign investment is one of the main methods of technology transfer. Generally, a foreign investor (business, state actor, private funds) invests in developing countries in order to create a new market, remove export barriers and make use of local advantages. The receiving country benefits by means tothe development of its own research environment, in addition to general improvements in business and economic environment. The major drawback of direct foreign investments is the need for the receiving country to create incentives.

2.2 Benefits of Technology Transfer in Dynamic business environment

Regardless of the benefits granted for the involved members by each type of Technology and Knowledge Transfer scheme described in the previous section, there are undeniable benefits provided by the creation of a dynamic business environment. However, this type of business environment prerequisites technological advancement and open innovation, supported among others by the state investments towards it. The benefits resulting from this investment are multidimensional and substantially interconnected, including, among others(2015 Innovate Cyprus) the creation of new innovative and competitive businesses, the development of new innovative products, services, processes and business models from existing businesses, which will contribute to profitability and enhance their market share, the significant contribution to the labor market through the creation of sustainable jobs and opportunities for highly skilled human resources, the improvement of productivity of both the private and the public sector, the attraction of foreign investments and multinational companies, which will contribute to the transfer of technology and knowledge from abroad and will contribute to the country's GDP, the social benefits through offering to the public a wider choice of suitable products and services with enhanced capabilities and reduced costs, the address of social challenges related to health, the environment and social well-being and the general improvement of the living standard of citizens.

Furthermore, a dynamic business environment is essential for the promotion and diffusion of innovation. The challenge is tosuccessfully incorporate existing and potential R&D by

fostering entrepreneurship and creativity to trigger innovation and economic competitiveness. Part of this procedure is the adoption of measures targeting knowledge diffusion and absorption of ideas and innovations, an important part of which lies with the promotion of technology transfer schemes to supplement any investment in knowledge generation. As the use of applied R&D increases, so does the potential number of innovation actors and the willingness to further invest in knowledge production.

Since innovators can often complement any present state mechanisms,they can also help to create a more dynamic innovation system. In many cases, they contribute to the structural and technological changes needed to adapt to new circumstances and challenges. Progress in achieving knowledge diffusion and absorption can be measured through data on the number of innovative companies, patent applications and exports of high-tech products, among others.

2.3 Risks and Challenges

Technology transfer can be acomplex process, requiring relevant skills and experience in needs assessment, that can lead to negative results that include malfunctioning or nonfunctioning products or services. Some common reasons for technology transfer failures are the following:

- Inaccurate Assessments that have been made before the technology transfer activities (such as failures in market research);
- Lack of competent specialists within a transfer team;
- Costoverruns;
- Non-verifiable or underperformance of technology and technology owner competence;
- Fast obsolescence of Technology;
- Overly sophisticated Technology not easily transferable in the local environment;
- Non-establishment of long-term communication after the supply of services;
- Lack of attention paid to training andanother non-technical part of transfers.

3. Rules for Technology and Knowledge Transfer and IP Rights Legislation in Cyprus.

The intellectual property (IP) and copyrights are some of the most significant assets of aninnovation actor, and that also applies to IP rights are related to Technology Transfer, whether the actor is the initial owner or the beneficiary. This means that the choice of the jurisdiction where the management will operate is a strategically important decision to be made, closely linked the incentives placed in place. The chosen jurisdiction has to combine a wide network of double tax avoidance and an attractive tax regime.

Cyprus until recently presented serious gaps in various aspects of the Technology Transfer and IP rights regime. According to the 2015 Innovate Cyprus report, the Technology Transfer and Intellectual Property Rights (IPR) Management presented limited focus on the commercial exploitation of IPR resulting by existing policy measures. A further recognized issue was the insufficient interconnection of Universities and Research Centers with industry and the market. The report also noted the absence of know-how and support institutions for IPR Protection and Management (in the form of IPR consultants, patent attorneys, etc.) and of Technology Transfer Offices. Finally, another important observation regarded the discouragement of academic engagement in business activities.

At the same time, Cyprus scores very highly on the EU's trademark (275.8% of the EU average in 2016 based on EIS) (RIO, 2018). However, this is mainly due to the Intellectual Property Rights Box scheme (see below), whereas in reality, the overall support for entrepreneurship stemming from scientific knowledge is almost non-existent (Theocharous et al, 2017).

The protection of Intellectual Property copyrights is essential as it provides serious advantages to the respective owners. By protecting IP, intangible assets of the company can turn into financially valuable capitals, while the acknowledgement and development of these strength points can position the establishment at a competitive level with many advantages. The Intellectual Property Rights (IPR) in Cyprus is a result of protection provided by EU and the International Regime of IP protection, according to respective international

agreements signed by the country or deriving from its participation in international organizations. Examples include the World Intellectual Property Organization, the agreement and protocol of Madrid for the international registration of trademarks, Paris convention for the protection of IP, the Patent Cooperation Treaty, the Bern convention on the protection of literature and artworks. At the same time, the tax regime of Cyprus provides exemptions from taxation arising from the use of IPR. The IPR in Cyprus apply automatically and without requiring any further registration. According to the Intellectual Property Law (59/1976).Intellectual Property copyrights are protected for the following categories:

- Scientific work
- Literature work, including computer programs and applications
- Musicworks
- Artworks, includingphotography
- Movies
- Databases
- Recordings
- TV / Radio shows
- Publications

These apply for Cypriot citizens and Cypriot companies for their work worldwide and for foreigners for their work issued in Cyprus. A company formed in Cyprus can own IPR sharing the rights to other establishments located in Cyprus or abroad. Registration of the IP copyrights from a tax resident company in Cyprus leads to protection in all EU state members, as well as protection arising by all the agreements signed in international conventions from the Republic of Cyprus.

Operating as an incentive for the establishment of IP holding rights companies in Cyprus, the applying tax regime includes the following:

- Every capital expenditure of a company concerning the development of intangible assets (trademarks, patents, intellectual property rights) is equally allocated in a 5 years period.

- 80% of the profit arising from the use of intangible assets (including compensations for the unlawful use of these assets) as well as profit from selling them, is considered an expense for determining the taxable income and is exempted from the corporate tax.
- The deduction of 80% will be also applied on the profit arising after all the expenses removal, like capital allowances, interest on the fund for the purchase or development of the asset, as well as other direct costs.

The owners of these companies can use Cyprus as a base for their operations and take advantage the tax deductions and exemptions provided, adding value and competitive advantage to their businesses and promote the idea of Technology Transfer involving Cyprus based institutions and businesses.

Regarding the IPR of research results, the situation appears more complicated. The results of the research activity have additional difficulties to find their way towards market due to the lack of internal IPR policies within the main academic and research institutions. Strengthening performance in the exploitation of research results, particularly in the universities and research institutes of a public and private nature, requires a significant shift in the culture of these institutions by placing 'Technology Transfer' as the third pillar of their mission, along with traditional pillars education and research.

On the institutional level, IPR fall under the jurisdiction of the Department of the Registrar of Companies and Official Receiver (D.R.C.O.R.) of the Republic of Cyprus, with the Intellectual and Industrial Property Section dealing with trademarks, patents and intellectual property matters.

The respective data for the period 2014-2019 (provisional data) are presented in tables 1,2 and 3 below.

Applications of Trade Marks	2014	2015	2016	2017	2018	Until 31/03/2019
	1.123	916	1.364	1.492	1.429	341

Table 1Applications of Trade Marks (2014-2019)

	2014	2015	2016	2017	2018	Until 28/02/2019
Number of Applications	923	912	644	903	1.061	193
Number of Classes	2.094	1.943	1.387	1.979	2.763	420

Table 2International Trade Mark Applications Based on The Madrid System with Cyprus as Designated Country (2014-2019)

Year	National Applications	Translation of European Patents	Translation of Patents Claims	European Applications	International Applications (PCT)	Renewal of Patents
2014	4	1.097	1	0	0	8.151
2015	7	1.203	5	0	0	8.475
2016	3	1.366	2	0	2	8.446
2017	12	1.379	0	1	3	8.911
2018	4	1.410	2	0	2	8.861
Until 31/1/2019	1	142	0	0	0	733

Table3Patents (2014-2019)

As part of the alignment with the acquis communautaire, the following laws have been passed:

- Intellectual Property Rights and Related Rights (Amendment) Law of 2002.

- Patent Law (Amendment) Law of 2002 - Legal Protection of Biotechnological Inventions.
- Designations of Origin and Geographical Indications, Agricultural Products or Food Law of 2002.
- Legal Protection of Industrial Designs Law of 2002.
- Legal Protection of Topographies of Semiconductor Products Law of 2002.
- Patent Law (Amendment) Law of 2002 concerning the supplementary protection certificates for plant protection products.
- Trademarks (Amending) Law of 2000.
- Companies Act (Amendment) Law of 2000, concerning the coordination of the company law of the Member States.
- Companies Act (Amendment) Law of 2000, with respect to companies with one shareholder.
- Companies Law (Amendment) Law 2001, concerning the qualifications of company auditors.
- Law on the Protection of New Varieties of Plants Law of 2004.
- Intellectual Property Rights and Related Rights (Amendment) Law of 2004.
- Companies Law (Amendment) Law of 2003, for public companies.
- Companies (Amendment) (No. 2) Law of 2003 on Company Accounts and Consolidated Company Groups Accounts.

4. Mechanisms for Technology Transfer in Cyprus

The various mechanisms and frameworks for Technology Transfer in Cyprus are part of the National Governance System for Research and Innovation. The System, adopted by decision of the Council of Ministers in 2018, was adopted after studying successful operating National Research and Innovation Systems abroad according to the specificities and specific needs of the Cyprus ecosystem of Research and Innovation, and taking into account the possibilities for reorganization, staffing of new structures inside and outside the governmental structure.

The new R & D Governance System was developed to meet the following basic requirements:

- Making the most of possible synergies between the public and private sectors and linking all stakeholders to the knowledge chain
- Strong political guidance, supervision and ownership
- Making use of existing extensive experience and know-how
- Ensure the necessary resources and capabilities for the functioning of the governance system
- Adoption of monitoring and evaluation mechanisms

The new System introduces new institutions and bodies, such as the new National Research and Innovation Council, the Chief Scientist, the "R & Co Coordinators" in all Ministries. It also provides for a unified and integrated approach to R & D at all levels, including the integrated integration of Research and Innovation issues into the portfolio of the Minister of Finance and the operation of the Research Promotion Foundation as an executive arm of the government on issues Research and Innovation.

4.1. Bodies & Institutions of the National System of Research and Innovation Governance (R & T)

4.1.1 Minister of Finance

Research and Innovation issues are integrated into the portfolio of the Minister of Finance. In this context, the Minister of Finance is the competent Political Chief for Research and Innovation, at both national and European level.

4.1.2 National Council for Research and Innovation

The National Council for Research and Innovation is the main advisory body for defining a strategy.The Council will undertake the promotion and implementation of the Research and Innovation Strategy on the basis of the recommendations of the INNOVATE CYPRUSreport, will submit proposals and suggestions on strategic issues and will monitor the implementation and implementation of measures that have been adopted at the policy level.

In addition, it will have a prudential and guiding role in the implementation of the new proposed National Framework for Research and Innovation and will be able to design corrective and evolutionary actions regarding the operation of the system and the implementation of the national strategy and sub-policy measures.

The Council will meet on a regular basis and its work will be supported by the Ex-officio Member and the Research and Innovation Directorate, serving as Secretariat of the EIC.

4.1.3 Lead Scientist

The creation and operation of the institution of the Lead Scientist are based on good practices (mostly in Aglosaxon countries) and its mission is to coordinate and guide the national framework at the policy level.

The Lead Scientist assumes a coordinating and supervisory role in the formulation and implementation of Policy Research and Innovation and the functioning of the National Research and Innovation Governance System, including the departments and bodies involved at both political and technical level. In addition, the Chief Scientist supports the work of the National Council for Research and Innovation to formulate Strategic Research and Innovation papers, as well as suggestions on the structure and operation of the Governance System.

The Chief Scientist is appointed by the President of the Republic.The Chief Scientist is appointed ex-officio as Chairman of the Board of Directors of the Research Promotion Foundation.

4.1.4 Directorate for Research and Innovation

The Directorate for Research and Innovation has the following responsibilities:

- Coordinate, support and monitor the implementation of the National R&D Strategy
- Design and coordination of R & D policy issues
- Tasks of the Secretariat of theAdministrative support Head of Science

The coordination of the National Strategic Research and Innovation and the management of policy issues is under the guidance of the Chief Scientist and the relevant Minister.

4.1.5 Research Promotion Foundation

The Research Promotion Foundation (RPF) is the executive arm of the government for Research and Innovation.

The implementation of its mission is achieved through the Foundation's main axes, which include the design and management of grant projects for research projects and innovative activities, support for the integration of Cypriot researchers into research activities in the European and international spheres and the provision of support services to enterprises for innovation development, technology transfer and international development.

Although the new structure of the Cyprus Research and Innovation Support frameworkcannot yet be assessed, significant weaknesses are still present, especially in terms of supporting entrepreneurship, safeguarding and managing Intellectual Property Rights in the research sector, technology transfer and the interconnection of research with the industry at local and international level. Especially regarding the issues of Technology Transfer, key support institutions are still missing from the Cyprus System, including a Technology Transfer Office, while the available know-how on the above issues is limited.

4.2 Funding Mechanisms and Programmes

4.2.1 General Presentation

Despite its importance, the funding subsystem is the weakest link in the RTDI system chain in Cyprus. The sub-system includes entities that support financially the development of RTDI actions and mainly innovative business activities. Essentially, the subsystem is dominated by the dominant role played by the State (using national resources and various EU funding mechanisms), mainly through the Research Promotion Foundation and the Ministry of Energy, Industry and Tourism.

The Private Sector’s participation remains very low compared to EU average, despite its increased relative participation in R&D activities in the post-crisis years.

4.2.2RESTART 2016-2020 Programmes

The RESTART 2016-2020 Programmes are the current multiannual development framework of Programs for Research, Technological Development and Innovation Support in Cyprus, co-funded by national and European funds and implemented in conjunction with other national initiatives and programs.

The vision of the RESTART 2016-2020 Programs is the emergence of the Research, Technological Development and Innovation (RTDI) sector as a key factor in the economic development of Cyprus, contributing to addressing the key economic and social challenges and developing the conditions for achieving sustainable development, in line with the principles outlined in the Europe 2020 strategic framework for smart, sustainable and inclusive growth.

The design of the RESTART 2016-2020 Programs focuses on the individual goals as well as the Priority Areas that emerged through the S3Cy Smart Strategies Strategy. At the same time, it is part of the Operational Program "Competitiveness and Sustainable Development 2014-2020", ie the development strategy of Cyprus for the utilization of ERDF resources under Priority Axis 1 "Enhancing the Competitiveness of the Economy".

Through the interventions under the Investment Priority 1b the following objectives are pursued:

- To promote holistic and integrated solutions that will enhance the competitiveness of the individual sectors of the Priority Areas that emerged from S3Cy. This objective is supported by the "Integrated Projects" Program, which involves the implementation of interdisciplinary long-term cooperation projects with the ultimate objective of providing integrated interventions to the dominant challenges presented by the Priority Areas and integrated solutions with an impact on the economic development and the reform of the individual production sectors.
- Strengthening SMEs, including new businesses, to develop innovative products and services, either individually or in collaboration with a research organization or other SMEs active in the field of research and innovation, and to encourage business collaboration with research organizations. This is supported by the "Enterprise

Research ", " Startup Businesses Research " and "EUREKA Cyprus", which involve the involvement of enterprises, including start-ups, in research and development activities and the development of new or substantial improvement existing products / services / production methods of high added value, individually or in collaboration with other research organizations and enterprises from Cyprus

- Creating a research and innovation culture both in business and in the wider society. This endeavour supports the "Social Innovation" Program, which involves the implementation of innovative ideas, products, services, technologies, models and strategies to address societal challenges and to cultivate a culture of social innovation, which means innovation with a social dimension.
- Ensure intellectual property rights and promote the commercial exploitation of research results. These endeavours support the Industrial Property Program to support patenting (patents, industrial projects) of significant research and innovation results with the ultimate goal of maximizing the benefits of exploiting research, development and innovation results.

The most relevant funding programmes are presented in table 4 below:

Pillar	Section	Programme
Pillar I Smart Growth	Research and Innovation Partnerships	Holistic Projects
Pillar I Smart Growth	Participation of Businesses	EnterpriseResearch
Pillar I Smart Growth	Participation of Businesses	Startup Businesses Research
Pillar I Smart Growth	Participation of Businesses	Expansion of Industrial Application Technology /Know-how

Pillar I Smart Growth	Extroversion – Open Horizons	Transnational Partnerships
Pillar I Smart Growth	Extroversion – Open Horizons	International Collaboration - Dual Targeting
Pillar I Smart Growth	Extroversion – Open Horizons	EUREKA Cyprus
Pillar II Sustainable RTDI System	New Researchers, New Ideas, New Opportunities	Social Innovation
Pillar III Transformation of RTDI System	Support Mechanisms	Innovation Vouchers
Pillar III Transformation of RTDI System	Support Mechanisms	Industrial Property
Pillar III Transformation of RTDI System	Support Mechanisms	Participation in International Networking Activities
Pillar III Transformation of RTDI System	Support Mechanisms	Encouragement of Project Coordination in the Horizon 2020 Programme
Pillar III Transformation of RTDI System	Alternative Funding Forms	Commercial Exploitation of Research Results
Pillar III Transformation of RTDI System	Alternative Funding Forms	Commercial Exploitation of Research Results by Businesses

Table4RESTART 2016-2020 RelevantProgrammes

The total budget of the RESTART 2016-2020 Programs amounts to € 99,140,000.

An amount of € 45,000,000 is foreseen to be covered by the European Regional Development Fund.

4.2.3 Scheme for Development New Innovative Products and Services (Ministry of Energy Commerce and Industry)

The Scheme aims to support and strengthen existing and newly established firms investing in research and innovation to develop competitive innovative products and services that they plan to market and/or innovative processes and processes in the production of their products. It also aims to support and promote collaborations between businesses and businesses with research organizations.

This objective is to be achieved by the use of incentives in the form of financial aid.

Particular emphasis is placed on the development of products and services that can be protected by patents or industrial designs. The project is co-funded by the Republic of Cyprus and the European Regional Development Fund of the EU.

The amount earmarked for the project will amount to € 10 million. The total budget of the Scheme, to be allocated for the 2014-2020 Programming Period, amounts to € 18.000.000.

4.3 OtherSystemElements

4.3.1 Other Funding Tools

In addition to the two main funding frameworks, an additional number of funding tools is available in Cyprus. These are the following:

- JEREMIE Initiative (funded by the European Investment Fund)
- EaSI Guarantee Financial Instrument (funded by the European Investment Fund) - having replaced the EuropeanProgress Microfinance Facility (again funded by the European Investment Fund)
- CyprusEntrepreneurship Fund – CYPEF (Funded by the Bank of Cyprus and European Investment Fund)
- Cyprus Business Angels Network (CYBAN)

4.3.2European Business Support Centre in Cyprus

The European Business Support Centre in Cyprus is part of the European network "Enterprise Europe Network" and serves as the focal point for the provision of information and advisory services in order to support the development of competitiveness and innovation of Cypriot businesses.

The aim of the European Business Support Centre in Cyprus is to provide business support services and play an important role in:

- ensuring access for small and medium-sized enterprises (SMEs) to information relating to the operation of the internal market and available opportunities
- providing feedback from SMEs for policy development and impact assessment,
- providing support to enterprises for cross-border cooperation,
- disseminating information and raising awareness of innovation-related policies, legislation and support programmes,
- promoting the exploitation of results from research programmes,
- providing brokering services for technology and knowledge transfer and,
- building partnerships between innovation actors.

In order to carry out its mission, EBSC offers a range of services including mediation for business agreements, participation in joint projects, technology transfer, innovation and knowledge, dissemination and exploitation of research results and support for issues related to national and European legislation and programs.

4.3.3Liaison Offices

The Liaison offices of universities can perform various important functions in the technology transfer process. They act as information mediators, as "commercial representatives" for science, as catalysts for academics involved in various businessactivities , and as mediators to increase student employability through increased contact with businesses during their studies.

5. Guidelines for Innovation and Technology Transfer for Businesses in Cyprus

Technology transfer goes far beyond a simple supply of machinery and equipment. It also involves the transmission of production methods, management arrangements and marketing strategy. The buyer normally expects the acquired technology to have at least the same results as in those in the originating environment. So, technology transfer can be described as a process of acquiring knowledge and skills. Businesses that are distinguished and lead in technology transfer typically apply the following policies:

- Develop contacts with various stakeholders such as suppliers, competitors, research centres and scientists, where they are future sources of technology or information
- Access to continuous technological information and flow of technological information where it is achieved through participation in exhibitions, technology transfer networks, information days and the use of specialized databases
- Using specialist consultants at various stages of the process until the ultimate implementation of technology in the business. This includes: legal advisors to sign the contract, technology rating consultants, technology transfer consultants through various alternative mechanisms

Since Technology Transfer consists of different phases, is limited in budget and time and involves different groups in its implementation, this creates the necessity to consider it as a project and apply the project stage management approach.The implementation of the technology transfer project can be divided into seven stages:

- Technology Identification
- Technology Search
- Technology Supplier Selection
- Negotiations
- Signing an Agreement
- Transfer Implementation
- Launch and Adaptation

Various specialists should be involved in the technology transfer project: engineers, economists, lawyers, financial and marketing experts. (Often, only engineers are responsible for the technology selection which is one of the reasons for subsequent failures).

5.1. Technology Identification

The major point of technology transfer is the choice of the appropriate technology and, consequently, the determination of the search criteria.

First of all, at this stage, the team of specialists should identify an exhaustive list of features that a given technology should have. Then, the main technical and economic parameters of this technology should be determined. Understanding technology's features and its characteristics will enable to lead a prior search of technical and organizational solutions existing in the relevant sphere. Finally, the components of the new technology (equipment, new competencies, and organizational changes) could be defined.

Another crucial point related to technology transfer is an objective analysis of internal competencies of the company, its strengths and weaknesses (Current technological level, limitations, needs).

The analysis of technology parameters often requires the involvement of a third-party expert. The company may not have enough experience and expertise in various narrow fields that technology could include. The independent expert's opinion will give a deeper assessment of technology parameters in accordance with the latest trends in the respective field. The more sophisticated and large technology is, the more experts should be involved in its assessment. The success of technology transfer directly depends on the accuracy of technology identification. The more it is exhaustive, the more innovative and efficient technology will be.

Once a company has analyzed its own capabilities as well as technical characteristics, it can decide if there is a need for full or partial technology transfer. For example, a company can just buy a license or a patent, which would be less expensive than a total technology transfer. Moreover, from the first stage of technology identification, the technology

transferring company can start to consider which transfer method will be appropriate for its particular case.

5.2. Technology Search

Potential technology sources can be divided into two groups: 1) universities, laboratories, research and academic organizations; 2) manufacturers and commercial enterprises. The advantage of sourcing from research organizations is an opportunity to get the most innovative technology at the cost which is generally cheaper than in case of its purchase from manufacturers. The disadvantages are additional costs for technology implementation and promotion. When purchasing technology from a manufacturer, the product/service is an already proven business model. But, generally, the manufacturer will not sell their most advanced technology, to avoid the creation of a new competitor.In the case of a large-scale transfer, various pieces of technology can be supplied from different sources.

While looking for a potential technology, a company should study the largest number of possible sources of information such as the Internet, industrial and trade associations, chambers of commerce, embassies, exhibitions, conferences, technical journals, international organizations. Major international organizations in technology transfer areUNIDOandAPCTT.

5.3 Technology Supplier Selection

Once the company starts to communicate with a potential supplier it will face information asymmetry. As in most sales transactions, the seller has more information about his product than the buyer. A supplier who has created a technology knows much better its strengths and weaknesses than a company that wants to buy it. So, it is extremely important to critically evaluate the technology itself and consider the entire package offered by the supplier.

The following cases should be considered:

- The price offered by the seller (there are different methods of technology evaluation that could be used price assessment);
- Technological characteristics and performance under the criteria that were selected at the first Identification stage;

- What other services besides the technological ones are included in the package (training, marketing, R&D collaboration etc.)?
- What are the seller's warranty obligations?
- In the case of industrial transfer, whichare the technical efficiency and ecological impact?
- In the case of product launch, does the buyer get the right to use a trademark? Is it an exclusive right or not?
- What changes in work and management of acquiring company does this technology require?

Seller's reputation and background is another important thing to consider. While selecting a supplier it is important to consider his expertise in the respective sphere, national and international market share, previous experience in technology transfer. Today, using the Internet, social and professional networks, we can get relevant information and feedback about almost any company.

5.4 Negotiations

There are two main goals of negotiations:

- Achieving the most favourable price;
- Developing the implementation plan for the upcoming transfer.

In most cases, technology doesn't have a fixed price. Parties can influence the negotiation process, providing certain arguments and counter-arguments. Therefore, an appropriate strategy of negotiation should be adopted. The negotiation team should consist of the specialists dealing with engineering, financial, legal aspects of transfer as well as a gifted team leader.

Generally, the seller is trying to negotiate from a position of strength, dictating the best price for him. However, the buyer is not the only one interested in technology transfer. The seller's motivation in transfer and, consequently, a base for the buyer's counter-arguments may be the following:

- Expanding into new markets, which are difficult to achieve by mere export. Opening a production facility in a foreign country is associated with high risk and requires large investments;
- It is not easy for a foreign company to compete with local players, especially in developing countries;
- It could be profitable for a foreign company to make a joint venture with a safe partner rather than to have an agent supplying new contracts from time to time;
- Selling an existing technology, a company could raise capital for its future development or cover the costs of its previous research;
- By means of an industrial alliance, a company could profit from the foreign partner's network;

The technical part of negotiations should be preceded by bilateral visits, during which the parties have to understand what should be exactly transferred and where. Practice shows that technology cannot be a mere copy of an existing process or product. In the case of manufacturing, technology should be adapted to a new environment where some technology parameters should be changed. In the case of new product launch, cultural aspects, as well as other particular features of the local market, should be taken into account.

5.5. Agreement

Once the understanding has been reached during the negotiations, the parties should complete a technology transfer agreement.

The main goal of this agreement is to put in written form all the decisions that have been made during the negotiations. At the same time, there is no common type of such agreement which could be applicable to all transfers. Its content varies from one case to another.

However, there are some major clauses that should be included in practically all transfer agreements:

- Technology Description:Technology and related processes should be explicitly described in the agreement;

- Technology Package:The agreement should specify all the documentation and services (specifications, layouts, certificates, technical support, personnel training, etc.) that the supplier undertakes to provide along with the technology;
- Technology Improvements:It can be agreed that all the technological improvements made during the transfer should be available to the buyer;
- Guarantees:Thesupplier should guarantee technology performance, failing which he should indemnify the buyer;
- The effective date of agreement:The agreement should specify the period of time during which it will be valid.
- Rights and obligations:In order to avoid potential ambiguities in further work, all the rights and obligations of the supplier and the buyer should be specified in the agreement.
- Rights regarding the intellectual propriety:Does the buyer get an exclusive right to use the technology? The territory which limits the validity of the patent; Specific rights conferred to the buyer of the patent; Payouts in case of violation of the intellectual property right;
- Payment:The agreement should specify the amount, form and schedule of future payments;
- Arbitration:The parties can agree to settle a procedure of quick disputes resolution during the transfer. Therefore, the agreement should include an explicit description of this process;
- Regulation: It is important to specify the law which would be applied in case of disputes;
- Termination of agreement: The parties should define the causes for agreement termination, such as overdue payments, bankruptcy, insolvency or change of control;
- Force Majeure: In the case of force majeure circumstances, such as natural disasters, terrorism, strikes, embargoes, etc., neither party will be not responsible for any failure in their obligations.

5.6. Transfer Implementation

Technology Transfer requires the timely implementation of all scheduled stages.A close relationship between two parties at every stage and at every level is a crucial factor in transfer realization. No one knows technology better than its developer.So, the amount of knowledge transmitted from the developer to the buyer will determine the success of technology work after the transfer.

The fact of working with foreign experts, sometimes with completely different cultures and practices, could become a barrier to collaboration. Therefore, managers should contribute to the ongoing formal and informal communication between all the participants of the transfer.

The risks related to the motivation of a technology provider in a successful transfer could be minimized by accurate planning of each stage and implementation control. The project manager should develop the milestones enabling the supervision of each step. It could be any information related to the transfer, such as meeting reports, tests results, photos of installed equipment, etc.

As noted,Technology Transfer is more than simple procurement and commissioning. The major goal of technology transfer is skills and knowledge transmission.Therefore, training held by the technology supplier are one of the important parts of the transfer. They should be scheduled during the transfer process and not after it took place in order to start using technology immediately after the launching. In case of a new product launch, an appropriate marketing strategy should be developed by both sides, before the production launch in the buyer's country.

5.7 Launch and Adaptation

A Launch of new technology is associated with tests conduction, documentation transmission and final training.If technology transfer was supposed to enhance the performance of the industrial process, it would be possible to assess the current changes just after the launch.

While launching a new product, the results can be assessed only after a fairly long period of time. So in this case, the development of the right strategy to promote a new product becomes particularly crucial.

Typically, in the first weeks following the launch, technology passes through the adaptation period. Based on the analysis of the technology performance during this period, specialists can make some adjustments to the operation modes and correct the errors that haven't been initially considered. In addition, during the first weeks, managers can check if the involved personnel have received the required skills in technology operation.Transfer of new and innovative technology can initiate in-house research in the related area. After the technology has been transferred, managers should motivate the employees to continue the further development of this technology. The company could also consider future R&D cooperation with the technology developer.

6. Technology Transfer Centres and Supporting Institutions in Cyprus

The economic developments in Cyprus during its financial crisis, undoubtedly affected the R&I sector, in terms of funding and results. Especially when taking into account that public sector has traditionally been the dominant funding source, all public economic and financial developments have an important impact in future government expenditure on R&D, leading to the necessity for optimization of the said expenditure.

In 2013, the Cypriot government announced that significant effort would be put into R&I in an attempt to exit from the financial crisis. As a result, a National Committee on Research, Innovation and Technological Development (NCRITD) was set up by the Council of Ministers in September 2013, comprising of distinguished experienced scientists coming from the Cypriot academic, research and business sectors, to review the national R&I system and to make relevant recommendations on its governance to the President of the Republic of Cyprus. Its work was completed in March 2014 and its outcomes submitted to the President. Among its proposals are included:

- the creation of a new system structured on four levels (strategic, political, operational/implementation, and research stakeholders), integrating research, innovation and entrepreneurship,
- the appointment of a commissioner for research, innovation and entrepreneurship,
- the creation of a new DG covering these sectors under the Ministry of Finance,
- the establishment of an advisory committee, and
- the redesign of the role of the Research Promotion Foundation (RPF) to accommodate technology transfer activities.

Furthermore, the Smart Specialization Strategy for R&I (Smart Specialization Strategy for Cyprus), a conditionality for the use of European Structural and Investment Funds (ESIF) for R&I in Cyprus was approved in its final version by the Council of Ministers in March 2015, elements of which have been previously described.

The most important sectors identified through this process were Energy, Tourism, the Structured Environment/Construction Industry, Transport/Marine, Agriculture/Food Industry, Health as well as a number of horizontal priorities such as Information Technology, Environment, and Human Resources. Following its approval and according to a Decision of the Council of Ministers on 28 December 2015, a Governance Committee was constituted to act the Strategy's Monitoring and Evaluation Mechanism. It is consisted of political and academic members, namely the Permanent Secretary of the Directorate General of European Programmes, Coordination and Development (acting as Chairman), the Director General of the Ministry of Energy, Commerce, Industry and Tourism, the Secretary-General of the Cyprus Chamber of Commerce, the Chairman of the Conference of Rectors, the Chairman of the Councils of the Directors of Research Institutes.

The combined outcome of the two above-mentioned reports has been the National Policy Statement for the Enhancement of the Entrepreneurial Ecosystem in Cyprus (NPSEEC), formulated by the Ministry of Energy, Commerce, Industry, and Tourism in cooperation with the Unit of Administrative Reform, endorsed by the Council of Ministers on the 14th December 2015. According to the Statement, the focus is placed on five priority areas:

- Cultivation of anEntrepreneurial Culture

- Improvement of the Business Environment
- EntrepreneurialInnovation
- Access to Finance
- Access to markets.

In addition, a Cyprus' "National Integrated Industrial Strategy" is currently under development with its main objective "to increase the industry's productivity, innovation, and exports and its contribution to the country's Gross Domestic Product." (Service of Ministry and Technology, Government of Cyprus). The Strategic Pillars include Digitisation of Industry, the developing new skills and enhancing existing skills, improvement of the industrial / business environment, enhancing access to finance and to markets. These two strategies need to be paired with appropriate legislation reforms for their success, a work already in progress in several sectors.

After policy and legislation, funding and investment motivation on innovation for enterprises, whether these are SMEs or Start-ups, are the second important element for the development of a healthy Innovation Ecosystem. In this direction, Cypriot Government has, as part of NPSEEC, produced a package on Tax Incentives, with benefits of up to 50% tax exemption and up to a cap of 150.000 €, for investments in innovative enterprises whether these include their financing, shares acquisition or guarantees (Cypriot Presidency Reform Unit, http://www.reform.gov.cy/en/growth-reform/entrepreneurship-and-investments/tax-incentives-for-investing-in-startups-and-innovative-companies) . These incentives have been complemented with an updated definition of innovation in enterprises, by which a company must have spent 10% of its operating expenses on research and development in at least one of the last three years (verified by an external auditor) whereas Start-ups are assessed based on their business plan. In addition, innovation is now interpreted on a much broader basis than "traditional" R & D to include any innovative ideas that can be turned into entrepreneurship and commercial products, regardless of origin or themes.

Furthermore, international capital movement is encouraged and facilitated with the "Cyprus Startup Visa" scheme focusing on individuals or groups originating outside EU and the European Economic Area (EEA), to attract young talents for the benefit of Cypriot

Innovation Ecosystem (Cypriot Presidency Reform Unit, http://www.reform.gov.cy/en/growth-reform/entrepreneurship-and-investments/startup-visa). The final incentives refer to IP regime and bring Cyprus up to date with OECD approaches on the subject, linking R&D expenses incurred using public funds with the necessity of the regime, by allowing tax reductions from R&D profits.

The flow of public and public managed EU funds towards innovative activitiesis conducted either directly through competitive EU calls (as for example Horizon 2020), though Research Promotion Foundation for nationally designed policies and co-funding programs and priorities or through other financial instruments available by intermediaries in Cyprus, as for example CYPEF (Cyprus Entrepreneurship Fund – Co-financed Loan, funded by the Government of Cyprus and the Bank of Cyprus and managed by the European Investment Fund), InnovFin SME Guarantee Facility (InnovFin SMEG) and a scheme for Loans on Young Scientists Professional Activities (Directorate General, European Programmes, Coordination and Development, http://dgepcdv2.enasite.com/easyconsole.cfm/page/programme/fId/485/lang/en).

The preceding analysis of the identity and the institutional aspects of Innovation Ecosystem in Cyprus has shown that the main innovative developments have, for reasons relating to the composition and nature of Cypriot economy, been taking place in the public sector and especially in Universities and other state-funded Research Facilities.

Besides, the generally small size of enterprises in the Cypriot economy and the not so distant economic crisis have not helped in the emergence of a stable privately funded incubating environment. Despite that, recent initiatives have tried to change this image and according to both BERD indicator and other EUROSTAT data on private funding for R&D and Innovation, a relatively positive trend appears to have emerged regarding private R&I funding and cooperation. The next step to be taken is to ensure that this newly promoted private activity, especially regarding SMEs and startups, will be adequately linked to academic and university-driven research to create sustainable networking and clustering activities. Linked to the above was the launch of the new R&I framework programme, under the name “RESTART 2016-2020 Programmes”, in late 2016.

Regardingthe public innovating supporting institutions, a cross-thematic brief listing is provided below, that contains both academic and public bodies. (EC-DG R&I, Research and Innovation Observatory – Horizon 2020 Policy Support Facility, 2017). Relevant Public Bodies include the:

- National Council for Research and Innovation (NCRI – Highest Level Body for R&D strategy)
- Cyprus Scientific Council (Technical Advisory Board to the NCRI)
- Directorate General for European Programmes, Coordination and Development (DG EPCD) (independent governmental body for the design and implementation of R&D strategy)
- Industry and Technology Service of the Ministry of Energy, Commerce, Industry and Tourism
- Department of Fisheries and Marine Research, Ministry of Agriculture, Rural Development and Environment
- Research Promotion Foundation (RPF-Main Funding Agency).

The Higher Education Sector includes the Public Universities in Cyprus and other Research Institutes:

- University of Cyprus
- Technology University of Cyprus
- Open University
- Agricultural Research Institute
- The Cyprus Institute
- The Cyprus Institute of Neurology and Genetics

Out of these, the most relevant for direct linkages with private enterprises are (according to the general practice in Technology Transfer and Clustering) Universities, University-related institutions and the Research Promotion Foundation, for its potential funding role via the management of EU Research and other Funding and for its role in filling the gaps in applied research by direct funding.

An additional requirement for the implementation of successful R&I activities will be, as already mentioned, the formulation of a healthy and self-sustainable incubator environment to complement and commercialize the considerable research efforts already undertaken. At the moment, five business incubators are operating in Cyprus. These are:

- EKKOTEK HIGH-TECH BUSINESS INCUBATOR LTD
- ERMIS RESEARCH & INCUBATOR CENTER (ERIC) LIMITED
- GAMING INCUBATOR HOLDING LIMITED
- HELIX BUSINESS INCUBATOR LIMITED
- INCUBATOR INVESTMENT FUND LIMITED

The general climate as to collaboration schemes for innovation show preference to governmental support of the start-up ecosystem and to help from national universities than to traditional companies' willingness to collaborate with start-ups. However, the respective EIS indicator of public-private co-publications shows that Cyprus is at 21% of EU average, showing that despite declarations to the contrary there is still lack of strong collaborations between the public and the private sector. This is supported in the case of a final element, the Cyprus Science Technology Park (STP), which has been a pending plan for over a decade, since its approval in 2006. The Cabinet approved the framework for the creation and operation of the Science and Technology Park in Pentakomo, Limassol in July 2015 but the last call for tenders (2017) was not successful.

Conclusions - Recommendations

Regardless of the notable initiatives by public and private actors, additional actions are required to boost the entrepreneurial activity in Cyprus and its impact. In GEM Cyprus 2016/2017, the results of the Adult Population Survey (APS) and the National Expert Survey (NES) provided insights on the weaknesses of the entrepreneurial ecosystem in Cyprus and led to the derivation of numerous policies making recommendations. The results of GEM Cyprus 2017/2018 highlight that despite the progress recorded (e.g. ratio male and female entrepreneurs, more use of technology etc.), the weaknesses of the entrepreneurial ecosystem remain, to a large extent, similar across the two years. The similarity in the weaknesses identified across the two years underlines the need for additional action and prompts that last year's policy recommendations remain to some extent the same for 2017/2018.

Despite a high rate of entrepreneurial activity in Cyprus, certain environmental, legal and economic conditions delay or hinder entrepreneurial activity and its impact. Concluding this study, a number of recommendations are recorded to complement the guidelines presented in the previous sections, compatible withgovernmental commitments found in the Cyprus National Policy Statement[2].

EDUCATION

The National Policy Statement for the EntrepreneurialEcosystem includes numerous ambitious, but necessaryactions related to education. Further actions are proposed in the latest GEM Cyprus regarding additional policies related toentrepreneurial education, as this has repeatedly shown to be a serious lack in the Cypriot business ecosystem and educational system both at school and university level. Proposals the following:

[2]The National Policy Statement for the Entrepreneurial Ecosystemprovides quantified summary of the targeted actions of the government by 2020. These include:
a) to increase the number of businesses established each year by 20%,
b) to increase the percentage of viable new businesses by 25% by 2020,
c) to increase the number of businesses with high rate of development by 50% each year,
d) to increase the number of employees in start-up companies by 10% and in SMEs by 5% by 2020.

- Promote Science, Technology, Engineering andMathematics (STEM) training from a young age andespecially towards female students.
- Refine school-level educational programs to includecourses that cultivate an entrepreneurial mindset. Thesecould be courses that boost team-working and risk-taking culture, support out-of-the-box thinking andenhance financial education.
- Develop life-long educational programs targetinggraduates of different educational levels andbackgrounds. Such programs should focus ondeveloping the necessary soft-skills, technical anddigital literacy skills.
- Enhance education at all levels with courses andcase studies emphasizing on female entrepreneurship.
- Enhance existing entrepreneurship programs withhands-on training on developing and commercializingentrepreneurial ideas.
- Connect University level education and research withindustry.
- Encourage Universities to offer additional modules onentrepreneurship and digital literacy. These modulescould be mandatory for all academic programs andsupport the participation of students from differentbackgrounds in the same groups.
- Modify the structure of school-level training to assistindividuals in identifying their capabilities and talents,and formulate the necessary procedures that willallow teachers to promote talented individuals towardsadditional entrepreneurial training from an early stage.
- Provide training to the local business community on howto invest in new business ideas and training on how tosupport their employees in their intrapreneurial activity.

GOVERNMENT PROCESSES

Although the APS results highlight that government, taxpolicies and bureaucracy do not have an impact on businessdiscontinuance in Cyprus in 2017/2018, the NES resultsindicate that government procedures may be slowing down theprogress of entrepreneurial activity in Cyprus. The perceptionsof national experts as accounted in both NES 2016/2017 and2017/2018, stressing the deficiencies of the government in termsof providing permits and licenses quickly, and shaping policies in favour of new firms. GEMresults demonstrate that such weaknesses persist across both the 2016/2017 and the 2017/2018 surveys, thus can be regarded as of an urgent need for policy action.

Again, according to the GEM report, these may include:

- Modernization and acceleration of the procedures related tonew businesses such as registering a company orpatents, attracting foreign talent etc.
- Improvement of the efficiency of services provided by the“One-Stop-Shop” service of the Ministry of Energy,Commerce, Industry and Tourism, and foster widerdissemination of the service.
- Enhancement of the use of technology in the governmentsector and deploy electronic government services forall services related to new and growing firms such ascompany registration online (including name choice).
- Enabling new firms to minimize the need forintermediaries and external services.
- Fostering the transparency of public sector processes soas to eliminate fraud and relating suspicion.
- Enabling and fostering of wider use of digital signatures as a means for procedure safety and acceleration.

FINANCIAL SUPPORT

The results of the APS are encouraging as the rate ofbusiness discontinuance due to problems in getting financehas been reduced since last year. However, problems in securing finance are still the major issue for new entrepreneurialactivity. This view is equally supported by the resultsof NES. These findings underline that lack of access tofinance remains one of the entrepreneurial framework conditionsthat inhibit entrepreneurial activity in Cyprus. Proposals regarding the facilitation of financing include:

- Establishment of investment funds and attraction of investment funds for startups ofdifferent maturitylevels. A potential governmental role could include the management of an advisory board, together with assessment and monitoring authority.
- Extension of funding schemes available for translatinginventions and research results into commercialproducts.
- Legalizing and/or fostering other forms of funding such ascrowd-funding.
- Development of additional incentives for direct foreign investment and technology transfer.
- Update of the legal framework and administrativeprocesses of evaluating proposals for financialsupport.
- The encouragement the creation of more angel investors fromthe local business community.
- Tax-incentives and other relating benefits for the provision of early-stage pre-seed fundingto new businesses.
- Enhancement of funding schemes to provide small scalefinancial support,
- Simplification of the funding application of the procedure for governmentprograms related to new businesses, increase of thenumber and frequency of calls andacceleration of the evaluation process.
- Extension of women-targeted entrepreneurial support.

BUSINESS SUPPORT

Regarding the issues of the need for Business support improvement policies, the GEM results show that the main identified issues are the low growth and job-creation potential of businesses, as well the continuous gender imbalance in entrepreneurship in Cyprus. Although the cause for the first issue is not simple to pinpoint, at least partially thismay be attributed to the relatively small size of the marketin Cyprus and the non-innovative orientation of businesses, that present limited focus towards international markets and high-techproducts. This sector presents serious interaction with Technology Transfer policies, as shown by the policy recommendations that include

- Supporting the closer collaboration between academiaand industry so as to exchange know-how, co-use ofR&D infrastructures and prototyping facilities.
- Modifying existing regulation to foster the generationof spin-off companies throughout universities andresearch centres.
- Creating a pool of mentors from the public and privatedomain that hold hands-on experience and establishrelevant procedures for providing easy and quickadvice to new and small enterprises.
- Establish collaboration at national level with countriesthat display high innovation and entrepreneurship scores in relevant indices, especially in the EU.
- Creating a single information point that will consolidateinformation on all national activities related toentrepreneurship.
- Promoting female entrepreneurship by providingadditional incentives (both personal and entrepreneurial).
- Enhancing the criteria of national funding calls onentrepreneurship to acknowledge previousunsuccessful entrepreneurial attempts.
- Formulating and promoting open data policies.
- Improving Cyprus connection with the rest of the world to foster collaboration with entrepreneurs, investors andmentors from other countries, and contribute towardstransforming Cyprus into the innovation hub betweenEurope, Middle-East and Africa.

As a closing remark, it is not easy to overstate the importance of Technology Transfer for the development of the Cyprus entrepreneurship and innovation ecosystem, and how vital it is in helping to promote growth and economic prosperity. The ecosystem comprises complex relationships that are formed between actors or entities whose functional goal is to enable technology development and innovation. In the years after the recent financial crisis, Cypriot innovation actors have slowly but steadily started to flourish, simultaneously adding value to the economy and enhancing the local ecosystem.

As the two main bottlenecks in the "innovation-to-industry relations" system remain the limited human resources in the S&E area (small demand from business) and the limited engagement of business to R&D activities (no big companies / high-tech industry), taking advantage of the new Entrepreneurial wealth, that includes new business opportunities (solar, hydrocarbons), cross-sectoral linkages (food & special tourism), common new technologies (ICT), value chains and clusters (food, shipping, professional services, special tourism), will lead to a more open economy that will promote higher productivity and efficiency.

However, it goes without saying that the abovementioned require devoted endorsements by the various stakeholders (Investors and enterprises, Knowledge-based institutions, Public bodies, societal actors and International experts) from all major sectors who can help support the innovation process, and the Government services, to recognize that innovation seems to be the underlying tool to achieve multiple goals crossing the boundaries of various sectors, especially in the public sector.A final crucial element is that, since in many cases local small-scale stakeholders have little self-motivation experience as strategies and policies have always been produced in a "top-down" approach, they need to cultivate the feeling of owning the innovation processes.

References

- Andrenelli, A., J. Gourdon and E. Moïsé (2019-01-24), "International Technology Transfer Policies", OECD Trade Policy Papers, No. 222, OECD Publishing, Paris
- Brown, R (2000), Cluster Dynamics in Theory and Practice with Application to Scotland, Regional and Industrial Policy Research Paper, No.38,
- Case studies of clustering efforts in Europe: Analysis of their potential for promoting innovation and competitiveness, preliminary draft version for distribution in the European Presidential Conference on Innovation and Clusters, Stockholm 22-23/1/2008, prepared under the Europe Innova Cluster Mapping Project for DG Enterprise and Industry of the European Commission.
- CLUNET (2008) Cluster Policy Guideline Report», PRO INNO EUROPE – INNONETS
- Cluster Policy in Europe. A brief summary of cluster policies in 31 European countries (2008), prepared under the Europe Innova Cluster Mapping Project, Oxford Research AS, 2008
- COECON (2013), The Role of Innovation Brokers in a Knowledge Economy The Fourth Strand To Triple Helix, Triple Helix XI International Conference London, July 2013
- COMMUNICATION FROM THE COMMISSION (2010), EUROPE 2020 A strategy for smart, sustainable and inclusive growth, COM(2010)2020, Brussels, 3.3.2010
- COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, Strengthening Innovation in Europe's Regions: Strategies for resilient, inclusive and sustainable growth, COM(2017) 376 final, 18.7.2017
- Cypriot Presidency Reform Unit. (2015). National Policy Statement for the Enhancement of the Entrepreneurial Ecosystem in Cyprus. Retrieved fromhttps://issuu.com/presidency-reform-cyprus/docs/fc7917ffc2122a/1?e=23693381/36744221
- Cyprus Ministry of Education and Culture. (2016). Annual Report 2016. Retrieved fromhttp://www.moec.gov.cy/en /annual_reports /annual_report_2016_en.pdf

- Demetriades, M and Robledo-Bottcher, N, (2018), RIO Country Report 2017: Cyprus EUR 29151 EN, Publications Office of the European Union, Luxembourg
- DG EPCD (2015), National Strategy for Research and Innovation, available at http://www.dgepcd.gov.cy/dgepcd/dgepcd.nsf/page34_en/page34_en?OpenDocument
- DG EPCD (2017), National 'European Research Area' (ERA) Roadmap for Cyprus 2016 – 2020, available at http://www.dgepcd.gov.cy/dgepcd/dgepcd.nsf/page34_en/page34_en?OpenDocument
- Directorate General for European Programmes, Coordination and Development. (2015). National Strategic Plan of the Republic of Cyprus for Lifelong Learning 2014-2020. Retrieved from http://www.dgepcd.gov.cy/dgepcd/dgepcd.nsf/499A1CB95981643FC2257C7D00486172/$file/National%20Lifelong%20Learning%20Strategy%20in%20Greek.pdf.
- European Commission - European Cluster Observatory (2016), Clusters and Workforce Development, Discussion Paper, available at https://www.clustercollaboration.eu/sites/default/files/eu_initiatives/discussion_paper_skills_development.pdf
- EUROPEAN COMMISSION, Directorate-General for Research and Innovation. (2014). Cyprus - Research and Innovation performance. Luxemburg: Publications Office of the European Union.
- European IPR Helpdesk (2017), The European IPR Helpdesk - Your Guide to IP in Europe, available at https://www.iprhelpdesk.eu/sites/default/files/2018-12/european-ipr-helpdesk-your-guide-to-ip-in-europe.pdf
- European Union. (2017). European Innovation Scoreboard 2017 - Methodology report. Retrieved from http://ec.europa.eu/DocsRoom/documents/25101

- European Union. (2017). European Innovation Scoreboard 2017. Retrieved from https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en
- European Union. (2017). Innovation Union. Retrieved from http://ec.europa.eu/research/innovation-union/index_en
- Global Entrepreneurship Monitor (2017), Cyprus National Report 2016–2017
- Global Entrepreneurship Monitor (2018), Entrepreneurship in Cyprus National Report 2017–2018
- Guidelines for Cluster Development A Handbook for Practitioners (2013), available athttps://www.enterprise-development.org/wp-content/uploads/GuidelinesforClusterDevelopment.pdf
- http://www.clusterobservatory.eu/index.
- Innovative Clusters: Drivers of National Innovative Systems», OECD Proceedings, Organisation for Economic Co-operation and Development, 2001
- Lagendijk, A (1999), Good practices in SME Cluster initiatives. Lessons from the 'Core' regions and beyond. AL ADAPT report. Centre for Urban and Regional Development Studies University of Newcastle Upon Tyne.
- Lämmer-Gamp, Thomas/Meier zuKöcker, Gerd/Christensen, Thomas Alslev, (2011), Clusters Are Individuals. Creating Economic Growth through Cluster Policies for Cluster Management Excellence, Danish Ministry of Science, Technology and Innovation/Competence Networks Germany, Copenhagen/Berlin
- Maskel P and Kebir L (2005), What qualifies as a cluster theory?, DRUID Working Paper No. 05-09, Danish Research Unit of Industrial Dynamics
- Mindlin Y B, Zhukov B M, Prokhorova V V, Shutilov F V and Belova E O (2016), Main Stages of the Formation of an Economic Cluster, International Journal of Economics and Financial Issues, 6(S1) 261-265
- NCRITD (2014), Innovate Cyprus - Proposal for the creation of a new Integrated National Framework for Research, Technology Development and Innovation in Cyprus, available at https://rio.jrc.ec.europa.eu/en/library/innovate-cyprus-proposal-creation-new-integrated-national-framework-research-technology

- OECD (2007), Competitive Regional Clusters: National Policy Approaches, Regional Innovation
- OECD Innovation Policy Platform (2010), OECD Innovation Policy Handbook
- Porter, M. E. (1998), Clusters and the New Economics of Competition. Harvard Business Review, Nov/Dec98, Vol. 76 Issue 6, p77-90.
- Porter, M.E. (1990), The Competitive Advantage of Nations. London, Macmillan.
- Porter, M.E. (1998), On Competition. Boston: Harvard Business School Press
- Porter, M.E.; Stern, S. (2001), Innovation: Location Matters. MIT Sloan Management Review. Vol. 42 No4.
- RPF, DG EPCD (2015), Smart Specialisation Strategy for Cyprus, http://www.dgepcd.gov.cy/dgepcd/dgepcd.nsf/page44_en/page44_en?OpenDocument
- Statistical Service of Cyprus (CYSTAT), http://www.mof.gov.cy/mof/cystat/statistics.nsf/index_en/index_en.
- Unit of Administrative Reform, Ministry of Energy, Commerce, Industry and Tourism. (2015). National Policy Statement for the Enhancement of the Entrepreneurial Ecosystem in Cyprus. Retrieved from http://www.reform.gov.cy/en/growth-reform/entrepreneurship-and-investments/setting-up-a-policy-framework-for-the-enhancement-of-the-entrepreneurial-ecosystem
- WEF (2017) The Global Competitiveness Report 2017–2018. Retrieved from http://www3.weforum.org/docs/GCR2017-2018/05FullReport/TheGlobalCompetitivenessReport2017%E2%80%932018.pdf
- WIPO (2017) Global Innovation Index 2017. Retrieved fromhttp://www.wipo.int/publications/en/details.jsp?id=4193
- World Bank (2009) Cluster for Competitiveness A Practical Guide & Policy Implications for Developing Cluster Initiatives, World Bank, February 2009.