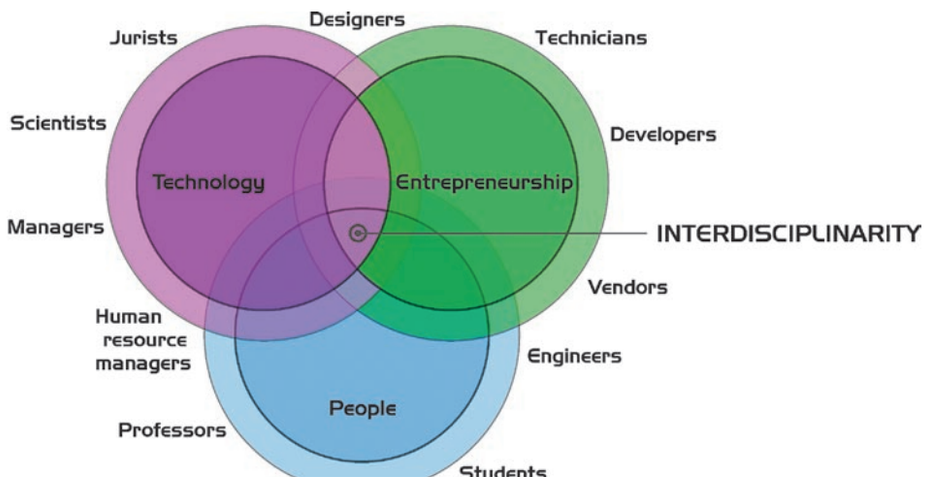
The pioneering concept of a creativity design centre based on ICT to provide living lab conditions for interdisciplinary postgraduate education, swift transfer of useable ideas into companies, knowledge and workforce exchange and formation of new, high-tech companies.

University Innovation Center – Technology Design Center

Andrej Gregorc

Lifelong education for competitive knowledge

Information and telecommunication technologies and services have become an essential part of social and economic infrastructure. Advanced information and telecommunication technologies and solutions are developing at an extremely high pace and are nowadays present in all areas of life, work and leisure. The information era, especially in its technologies for communication, has greatly changed the behaviour and the everyday lifestyle of society and has had a drastic influence on the process of education and knowledge-acquisition as well. In the past, obtaining a formal education at a university level more or less sufficed for a whole career, the knowledge only required to be occasionally updated and refreshed. Over the past few decades, the "life expectancy", or the usable duration of acquired knowledge, has been shortening steadily. A formal education to university level nowadays represents only the initial stage in the process of sustaining a level of knowledge, and especially the ability to use the acquired knowledge, in the following years. The latter requires constant contacts with an individual's professional environment, and expansion, upgrading and specialisation of knowledge and know-how. The former once-in-a-lifetime process of schooling has been replaced with a lifelong process of education and continuous learning. Simultaneously the enormous amount of information available and the large spectrum of skills required to successfully perform a highly demanding professional task have shifted the emphasis from narrow, specialised fields of knowledge to wider, interdisciplinary or multidisciplinary knowledge and abilities. The recent rapid and ongoing political changes in the larger European region, which enable unrestricted flow and exchange of people, goods, ideas and knowledge, have greatly stimulated the intermingling of different sciences as well as cultural diversity. All of the above-mentioned processes are a strong contributory factor driving universities, faculties and other scientific, research and educational institutions towards establishing types of educational and research environment which will better address and serve the needs and challenges of modern education and research.



Schema1

Is technology alone still good enough?

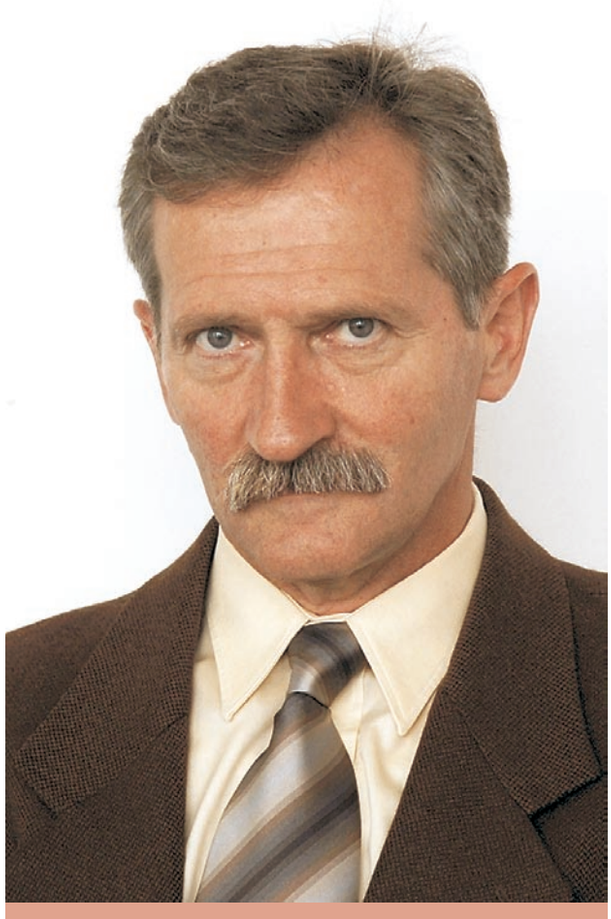
Slovenia and the University of Ljubljana are no exception in introducing new techniques, methods and forms of technological development combined

with research and education. Slovenia boasts well-developed companies in the fields of information and communication technology (ICT) and electrical engineering (EE), which have a long tradition and are widely, even globally recognised. Slovenian and European Union strategic documents define the field of ICT as one of the most significant to achieve the goals of the Development Strategy of Slovenia, the National Research and Development Programme and the renewed Lisbon Strategy. The latter focuses on endeavouring to find the way to long-term global competitiveness. The ICT branch is thus a recognised priority at European level and is one of the most innovative economic sectors of the EU. Research and development (R&D) investments within the ICT sector account for 18% of all EU R&D investments. However this share is still far lower than in the USA (34%) or in Japan (35%). Considering the existing Slovenian potential, the field of high-tech industries and the development of knowledge-based dynamic services are still underdeveloped, partially due to the lack of co-operation between scientific research institutions and companies. To improve the position of ICT and EE in Slovenia, industry and the University of Ljubljana initiated the establishment of an unparalleled centre for creativity in Slovenia. The centre will be based in Ljubljana within the future Ljubljana Polytechnic, the development of which is mandated by the Resolution on National Development Projects for the 2007-2023 Period, verified by the Government of Slovenia.

Combining knowledge, technology and real life experience

The creativity centre will be named the University Innovation Center (UIC) and Technology Design Center (TDC) for Information and Communication Technologies and Electrical Engineering (ICTEE®). The centre connects entrepreneurship and research work, engaging companies and universities, faculties and institutes. Experts, post-graduate students, researchers and entrepreneurs will, regardless of their expertise, join their abilities at the UIC TDC ICTEE® to develop new competitive products with high added value. In accordance with the implementation of the Lisbon Strategy goals, the financing of the UIC TDC ICTEE® will include funds from universities, companies, European and national programmes and, above all, structural funds, the 6th and 7th framework programme, technology networks and centres of excellence. The main goals and advantages of the UIC TDC ICTEE® can be summarised as follows:

- to exploit excellent development possibilities;
- to enhance connection between economy and science;
- to transfer and exchange knowledge and experience;
- to stimulate development;
- to develop new, highly demanding job posts;
- to form new, high-tech (also spin-off) companies;
- to achieve world-wide recognition and more foreign investment;
- to achieve higher economic competitiveness;
- to offer new, international inter-university post-graduate programs;
- to advance an interdisciplinary and multidisciplinary approach;
- to transfer knowledge transfer directly into market products;
- to develop more investment from companies;
- to provide an innovative environment;
- to engage highly motivated top young project researchers.



Prof. Dr Janez Nastran, Dean of the Faculty of Electrical Engineering:

"The importance of the ICTEE field as the backbone of numerous other services and fields makes it well-suited to function as a core for the establishment of a technology design centre. The Faculty of Electrical Engineering, its professors and students will take great pride in and will benefit significantly from such a distinguished facility."

The main aspect of the operation of the UIC TDC ICTEE® focuses on high-tech and innovative common projects, in which R&D and education institutions collaborate with companies. This mutual co-operation guarantees the quality and market value of the final product, service or solution, along with the establishment of a highly skilled workforce pool and the creation of market-oriented knowledge and skills, which are incorporated into the international postgraduate program. Joining the UIC TDC ICTEE® brings many advantages for companies, namely having highly skilled experts and adequate high-tech infrastructure at their disposal for fulfilment of their R&D plans, thus lowering the costs of development significantly. Participating in joint projects enables students and young researchers to accomplish their innovative ideas. The creativity centre provides not only the possibility of putting their innovative ideas into practice, but also the legal protection of intellectual property and opportunities for technology licensing, as well as formally recognised education obtained through project work.

Why the UIC TDC ICTEE® is different

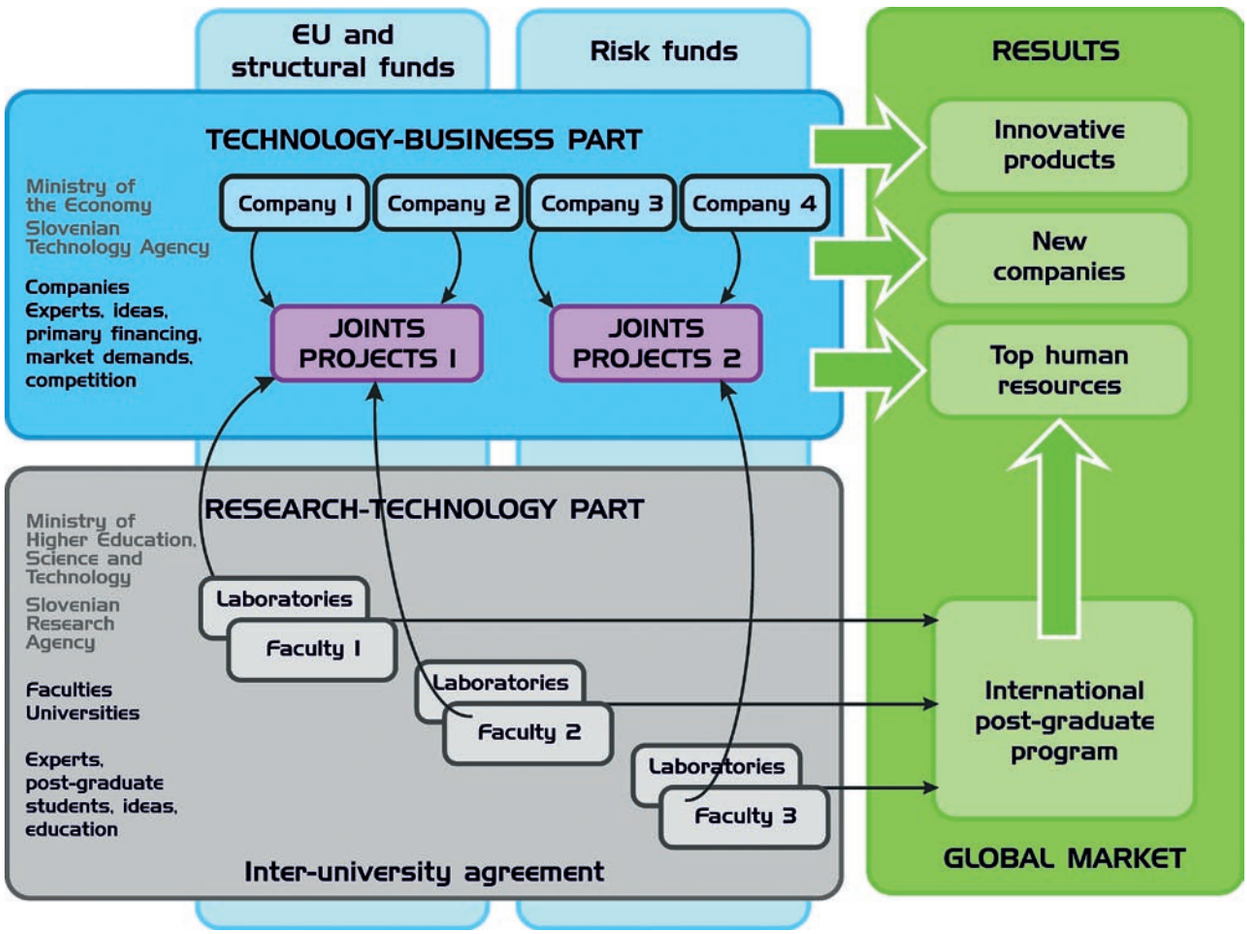
The proposed concept of the operation of the UIC TDC ICTEE® is based on the following key elements: a project focus; a business approach; a top-quality postgraduate programme and leading experts; interdisciplinary and multidisciplinary methods; networking (regional and international connection); a dispersed convergent infrastructure; open-minded design thinking and a living lab.

The project focus supports planning and presenting the original

ideas through a project. This process includes a detailed definition and realistic evaluation of the original idea in terms of realisation possibilities, which diminishes the risk of final execution. The business approach, included in the idea realisation from the very beginning, leads and directs the design, thus increasing the possibilities of a successful commercialisation of the final product, service or solution. The top quality postgraduate programme provides individual, interdisciplinary and international education, supported by project work. Syllabuses and educational programs are co-managed by companies, and this process develops even more highly skilled experts. Interdisciplinary and multidisciplinary methods are present both at educational and business levels. Although based on ICT and EE, the activities of the centre encompass numerous different fields including technology, natural sciences, social sciences, economics, law and design. Networking and connecting comprises co-operation with other similar and related institutions, associations and companies on a local, regional and global scale. A dispersed convergent infrastructure guarantees the basic conditions for successful and competitive functioning of the centre, providing a stimulating and motivating environment for creative, free, innovative thinking and idea conception. Open-minded design thinking in the context of the UIC TDC ICTEE® can be defined as a process of creative and critical thinking which enables the organisation of information and ideas, decision-making, improvements of conditions and acquisition of new knowledge. And finally, the living lab concept represents superb working facilities where participants enjoy being even after their research work. Informal socialising through spare-time, recreational or fun activities further stimulates creativity and the exchange of information, opinions and views.

The UIC TDC ICTEE® prioritises the following joint project segments, which are subject to further expansion or adjustment at any time, depending on new technological developments:

- dispersed broadband wireless and optical infrastructure;
- satellite toll-collection, and intelligent transport systems and logistics;
- energy measurement and control systems;
- e-medicine and e-health;
- digital television and digital multimedia content;
- intelligent energy networks;
- monitoring of the development of the information society and the status of information societies in EU Member States and candidates;
- intelligent and safe homes, and the intelligent connected office;
- new, environmentally friendly technologies;
- location-based and ambience-based services in the fields of navigation, tourism, traffic, national spatial databases, leisure activities;
- electronic government services;
- global network and service interoperability;
- future technological solutions, forms and activities for multimedia learning;
- knowledge exchange and storage, e-content, technologies supporting the processes of lifelong education.



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The networking concept – connecting companies, institutions and end-users

In addition to companies, the centre plans to co-operate with other technology centres or complementary initiatives, such as technology networks and parks, science parks and business incubators (Kranj ICT Technology Park, University of Ljubljana Development Institute, Technology Park Ljubljana, the Science Park of the University of Maribor, University Incubator Ljubljana, etc.). The UIC TDC ICTEE® will also be connected with the international test laboratory SINTESIO, the first European laboratory for testing next-generation network and service interoperability, supported and recognised by the European Telecommunication Standards Institute (ETSI). The centre will also ensure, stimulate and nurse international connections, as this is the only way to achieve the critical mass and globally competitive results, projects and knowledge.

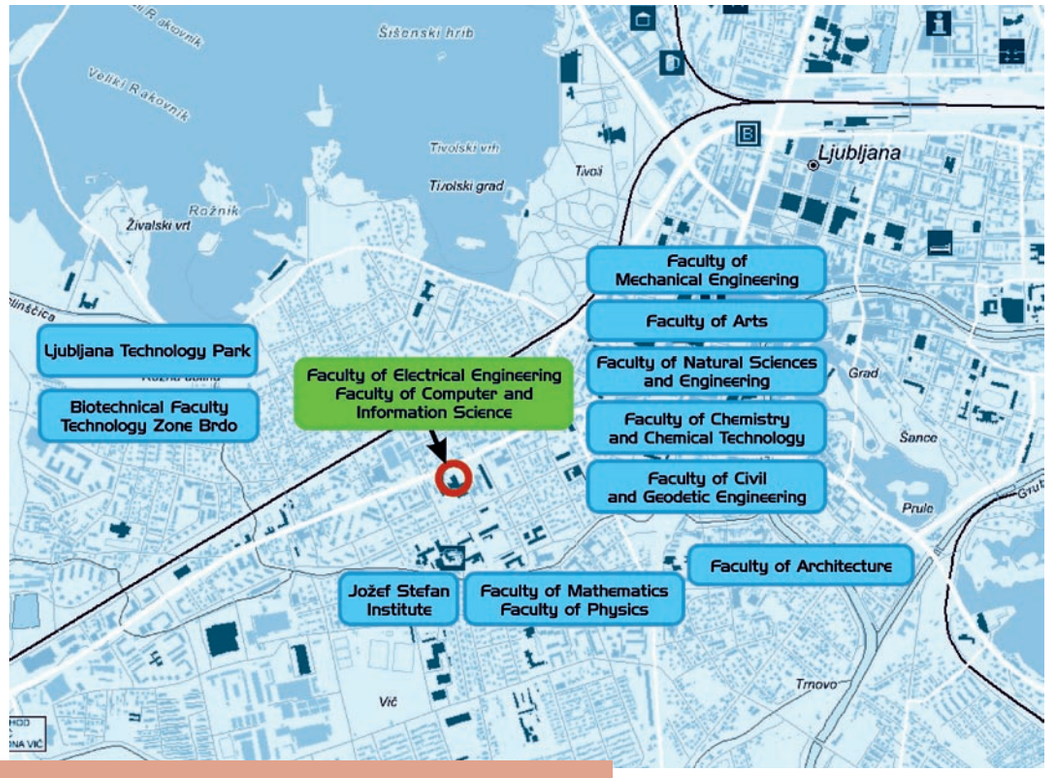
The premises will be located in Ljubljana, a mid-sized European capital city in the heart of the country, with good local and regional public transport networks, a low crime rate, half an hour's drive from a ski resort and only an hour from a seaside resort. Ljubljana, with its 300,000 inhabitants, perfectly matches the preferred location for science parks or technology design centres as, globally, over 40% are located in a city with a population of under 500,000. The UIC TDC ICTEE® will be in the direct vicinity of, and connected with, the Faculty of Electrical Engineering on Tržaška cesta. Almost 50% of similar centres worldwide are, likewise, directly co-located with the university. This particular location has many advantages over other location options and can be compared to the well-known concept of the polytechnic in some other countries. The main characteristics and advantages of the planned location at Vič are: proximity and a direct link to the Faculty of Electrical Engineering and the Faculty of Computer and Information Science, which together represent the main hub of the ICT field in Slovenia; the existing infrastructure of the Centre of Excellence for ICT and the ICT Technology Network of Slovenia; multimedia capacities; the several technical and natural science faculties nearby (the Faculty of Mathematics and Physics, the Faculty of Mechanical Engineering, the Faculty of Civil and Geodetic Engineering, the Faculty of Architecture, the Faculty of Natural Sciences and Engineering, etc.); closeness to the Jožef Stefan Institute (the central science-academic institution in Slovenia), closeness to the seat of the University of Ljubljana and also its constituent bodies (the Faculty of Arts, Faculty of Chemistry and Chemical Technology, Biotechnical Faculty, etc.), proximity of the student dormitories (Gerbičeva and Rožna dolina), proximity to the recreation area of Mostec-Tivoli and the brand-new Technology Park Ljubljana, easy access to Ljubljana beltway, and (with the completion of a connective tunnel in 2008) excellent and quick access to international flights at Ljubljana Jože Pučnik Airport (30 km).

Prof. Dr Andreja Kocijančič, Rector of the University of Ljubljana:

"In times when inter-faculty and even inter-university studies, student exchanges and visiting programmes are part of modern university education, the initiative for the establishment of a multi-disciplinary technology design centre is more than welcome. Besides further strengthening interdisciplinary studies and student mobility, it could help narrow the gap between social and natural or technical sciences and further diversify the range of studies and the research role of the University of Ljubljana."

A creative and stimulating working environment

The specially designed facilities are one of the advantages and a very distinctive feature of the UIC TDC ICTEE®. They create the most suitable, comfortable and pleasant conditions required for quality and successful work by research workers, postgraduate students, professors and other experts. The main advantages of the creativity centre are as premises for creative brainstorming and design thinking, stimulating creative freedom of mind, spontaneous new ideas and acquisition of new knowledge supported by modern communication infrastructure and equipment. Also different from common practice are the state-of-the-art laboratories that, at a single location, support quality project work, prototype development, integration, verification and immediate presentation of results. There are several research/study rooms and lecture halls for teaching and learning, while relaxation and spare-time facilities are also planned. The whole UIC TDC ICTEE® complex is designed to function as a living lab, enabling its regular users or daily visitors to spend most or all of their spare time within the centre, participating in recreational and social activities. The facilities are designed to be multi-functional, thus enabling individual rooms to be used for different purposes, quickly joined or divided or changed into a completely different layout. The planned complex of 7000 m2 includes 10–15 rooms for creative



Schema 3

Prof. Dr Jadran Lenarčič, Institute Jožef Stefan, Director:

"Research institutions must always work hand-in-hand with companies and educational institutions. Due to the different nature and organisation of work processes, this co-operation sometimes does not function as smoothly as it could. Therefore, the idea of bringing all three different spheres together at one location and providing them with excellent working conditions is superb. We should expect nothing less from its results."

Schema 4

brainstorming and design thinking, 15 laboratories, 2 spacious plenary lecture halls, 100 research/study workstations, relaxation and free-time facilities, rooms for gathering and socialising, a main hall with an info point and a demo centre, a cafeteriand, an underground garage, along with project, administrative and support offices and rooms.

What can the UIC TDC offer you?

The project of establishing the UIC TDC ICTEE® is a joint initiative of the companies of the ICT Technology Network of Slovenia, Technology Park Ljubljana, the Centre of Excellence for ICT, and in co-operation with the Ministry of Higher Education, Science and Technology, the Ministry of the Economy, the Government Office for Growth and the University of Ljubljana. Companies of the ICT Technology Network of Slovenia, in partnership with the Faculty of Electrical Engineering, have also jointly published a brochure laying out the strategies of the establishment of the UIC TDC ICTEE®. According to analysis, 40% of European economic growth is based on ICT, and this applies also to Slovenia. Slovenia is one of the few countries in the world that has the knowledge, capabilities and opportunities for development and

production of integrated information and telecommunication systems, services and solutions. However, in spite of the great potential, the high-tech industry is not yet developed enough. The UIC TDC ICTEE® therefore represents a breakthrough solution which could contribute to advanced development. The UIC TDC ICTEE® equally combines and connects science research and educational institutions and companies, which guarantee the quality and market value of the final products, services and solutions through co-operation in joint projects. This kind of co-operation also ensures excellent personnel, who gain individual, interdisciplinary and international education through their involvement in the UIC TDC ICTEE®. Their acquired knowledge will be formally recognised in the form of academic titles. Through its operation, the UIC TDC ICTEE® will guarantee the market value of the projects it develops, and leading experts, thus giving the Slovenian economy a unique opportunity to become more competitive. At the same time, education at university level will benefit from a leading technology development centre. A technology centre can also function as an important linking factor between the university, the local economy and the local environment, which it diversifies and enriches. It is an example of a new, fresh approach to integrating the educational, research and business spheres. Established as an independent institution, the centre is, in a way, conceived as a hybrid between a faculty, a research institute and a company. It functions as a provider of postgraduate education, R&D services and technological solutions for the problems of contemporary society, across a number of fields in ICT, EE and beyond. Essentially, the technology design centre focuses on uniting individuals with higher knowledge in different fields into research and think-tank groups with the aim of providing new, different or better solutions, opinions, ideas, services, products or entrepreneurial concepts meeting the brief. The centre will provide state-of-the-art research equipment, the required administrative and logistic support, and a relaxed, informal working atmosphere, which will enable the participants to intermingle their work and spare time within the living lab. When its doors open, it will seek highly motivated individuals who want to be at the centre of creativity, ideas, action and knowledge with no regard to their profession, age, background or motive. You're welcome to join.

Franc Dolenc, Iskratel, Director of Products & Solutions:

"Although our company, especially its R&D department, is in constant contact with faculties, laboratories and research institutions, we salute and support all new forms and possibilities of co-operation. Being directly involved in research projects gives us even faster results and information, and enables us to establish contacts with prosperous students and researchers at home and abroad."