

## LUBLIN IT UPLAND – THE CASE OF A SMART CITY

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### **Abstract:**

The development of information and communication technologies (IS / IT) requires that contemporary cities should improve their functionality. In order to survive the crisis and the ever-changing environment, cities are taking up technological challenges in the field of IS / IT to increase the efficiency of the urban infrastructure, as well as to raise the awareness and participation of citizens in the whole venue. The Lublin IT Upland project, implemented by Lublin City Hall, is an initiative targeted on emphasising the potential, and creating a favourable environment for the development of the IT industry in Lublin. The industry is now the most dynamically developing sector of the local economy. The concept of the design is based on the principle of the *triple helix* as a tool for increasing the city's competitiveness through active cooperation between businesses, science and administration. It can be deduced that this representation is the practical implementation of the concept of clusters and has become the main element of the strategy of the development of the City. This article presents a case study in accordance with the concept of Smart Cities. By implementing modern technologies, the city has become a place of development, as well as modern, attractive and open for business and investors. Implemented measures also contribute to thorough changes in the strategy of partners involved in the collaboration, thereby increasing their competitiveness.

*Keywords: IT, smart city, business processes, synergy, triple helix, implementation, competitiveness*

## **1. INTRODUCTION**

In order to survive in the ever-changing and competitive environment, modern cities have to strengthen their competitive edge, and direct their activities toward the more widespread concept of Smart Cities. While implementing the “2013-2020 Lublin Strategy” (Pastuszek et al., 2015) the City of Lublin supports the building of a modern service sector focusing on the development of the IT ecosystem. Activities include supporting the IT industry in partnership with the business community, universities and IT department students during the implementation of the Lublin IT Upland project. The Project has become part of the efforts to attain complex objectives and become the City development strategy. Smart Cities is a joint undertaking between the residents, authorities, local business community and other institutions taking advantage of the wealth of roles in which they occur. The striving of local government to create better living and operational spaces should be supported by technology and the direct activity of the residents (ThinkTank, 2013). However, the transformation of the City into a Smart City involves a number of challenges. The process of implementation of the concept requires a strategy including, but not limited to, the required resources and infrastructure vital to achieve synergies in collaboration with the institutions from various sectors. The Dutch experience shows that the key in this case is to utilize Information and Telecommunication Technology (ICT) infrastructure (HVB, 2015). Polish metropolises are moving towards the Smart Cities concept. However, they face a number of problems and developmental gaps. A benchmark is the ranking of mid-size cities published during the European Smart Cities project (Vienna UT, 2007). Analysts from a consortium of universities in Delft, Vienna and Ljubljana carried out a benchmarking analysis of 70 centres comparing their compliance with the mandatory requirements to obtain the “smart city” label. The literature lacks an unambiguous definition of a Smart City. An attempt to develop a definition was made by M. Komninos who defined a smart city as a place having a high capacity to learn and innovate, create, with research and development facilities, tertiary education, a digital infrastructure and communication technologies, and also a high level of management effectiveness (Komninos, 2002). This paper presents the example of the City of Lublin, located in eastern Poland, on the European Union border, and the measures taken by the local administration to create the operational conditions for the City of Lublin to function as a smart city.

## **2. DIAGNOSIS OF ICT ENVIRONMENT IN THE CITY OF LUBLIN**

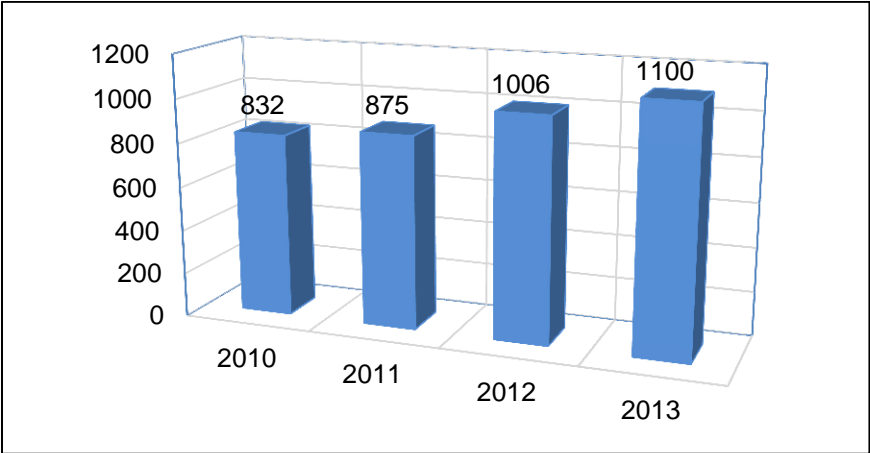
In the context of the quality of the ICT industry, the City of Lublin is perceived as a city still developing. In the opinion of the business community, academic circles and local government, in the City of Lublin there are many businesses active in the field of offering services based on modern IT technologies. In the ICT industry there are both large business entities that are branch offices of domestic or European companies, dealing with software development and implementation, and large local businesses. A noticeable trend is also the development of the operations of mid-size enterprises and microbusinesses that stand a chance of receiving funding or projects that are in the local government portfolio. Additionally start-ups have been growing dynamically. The number of businesses entities in the local market is the best evidence showing the growth potential of the ITC industry in the City. It should also be noted that several Lublin-based companies have operated continuously in the industry for almost twenty years. Larger businesses offer their innovative products outside the region or Poland and conquer foreign markets. This is proof of the quest for development and promotion, but may be also a result of the absence of large industrial centres and corporations that would be a target group for the proposed ICT services. A significant role in adding dynamism to the ICT sector is being played by the universities that are educating future IT specialists (Benefactor, 2012). The growth of the IT sector in Lublin, in addition to modern technologies and products, is based primarily on intellectual capital, competitive labour costs and the availability of modern office space.

### **2.1. Intellectual capital and ICT companies in the City of Lublin**

The City of Lublin has a large ICT environment potential, activated and supported by the high availability of intellectual capital. It has at its disposal a large academic base (almost 75 000 students in the 2014/2015 academic year), educating approximately 2.3 thousand students in computer science, and together with related fields of study such as: IT education, mathematics with IT and electrical engineering majors – totals almost 5.8 thousand students who are studying at six universities (ABSL, 2013). The number of graduates in these fields of studies exceeds 500 per year and clearly shows an upward trend. In conjunction with the constantly growing number of job vacancies, it is conducive to development of the ICT sector in the City of Lublin (City of Lublin, 2015).

For several years now the City of Lublin has been realising its potential as a strong city in the IT sector and in Business Process Outsourcing (BPO) (Outsourcing&More, 2013). According to market research, IT companies employ highly specialised programmers including university students close to graduation. Information Technology (IT) is the fastest growing industry in Poland. Thanks to the implementation of the 2013-2020 Development Strategy for the City of Lublin, the last couple of years have seen a dynamic economic growth in the Lublin ICT sector. This is borne out by the higher-than-average growth in the number of companies in this industry, located in Lublin, which is the highest in Poland when compared with cities of a similar size. Among the community of 750 IT businesses, there are more than 50 companies with the number of staff exceeding 9 workers. In four companies, the total is 100 workers or more (ABSL, 2013). In IT companies with 9 workers or more, the total headcount is more than 2.1 thousand workers. Approximately 1.4 thousand workers work for IT microbusinesses. In total, this means that almost 3.5 thousand workers working in the IT sector. Additionally a significant number of IT specialists work in other companies and institutions. It was estimated that the number of specialists in ICT in the City exceeds 5000 people (Benefactor, 2012). The vast majority of Lublin-based ICT companies belong to the Small and Medium-Size Enterprise (SME) category. A significant number of them offer niche products e.g. one4all solutions offered by the company called Syntea Business Solutions (ABSL, 2013). The largest IT company in Lublin is Asseco Business Solutions. Almost 40% of companies are involved in the development of business software, 30% develop applications to order, while others – offer different products (City of Lublin, 2015). At the end of 2013, in the local ICT market, 1 100 companies were operating that were classified in the telecommunications, software-related activities, and information-related services sector. This number continues to rise (Figure 1).

**Figure 1:** Registered ICT businesses in the City of Lublin



Source: CSO, 2015.

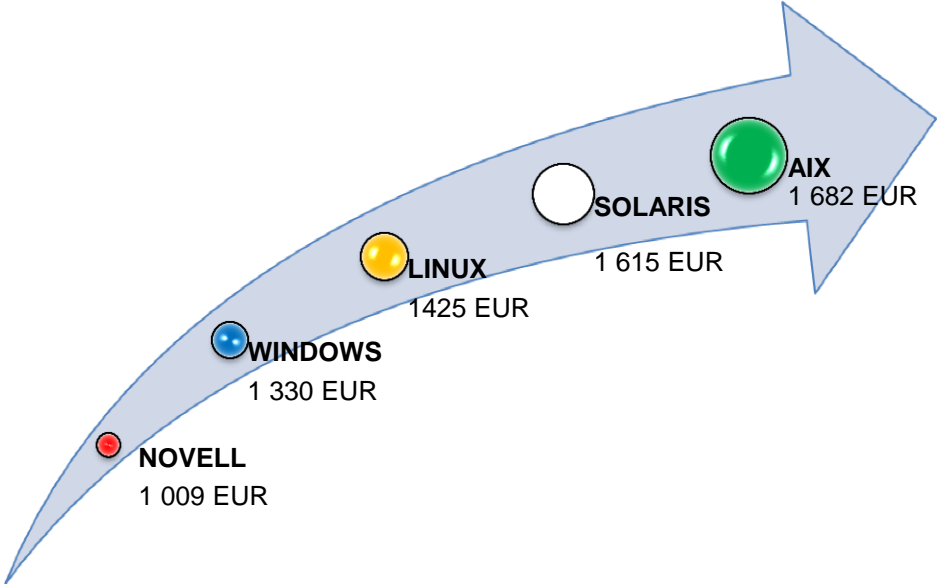
The top ICT businesses in the City of Lublin, by market share, are as follows: Asseco BS, Billenium, Britenet, Comarch, Compgroup Medical, eLeader, uPaid. Highly significant for the ICT sector are also businesses that have launched their businesses in the City of Lublin during the last 2 year. These include among others: Altkom, BLStream, Mobic, Sii, SoftSystem, Sollers Consulting, Transition Technologies, Trimetis and an American corporation DataArt. In the 2013-2014 the Lublin market was further enlarged by eight (8) IT companies with foreign capital. The headcount at the new investors' companies totals 300 people (as of March 2015).

**2.2. Labour costs**

A major factor in the competitiveness of the City of Lublin, which attracts investors, is also the labour costs of IT specialists. According to the market research company Sedlak&Sedlak, that analysed the findings of a nation-wide wage survey involving 14 808 respondents, including 8 429 people working for IT companies and 6 379 people working in the IT departments of companies from other industries, the salaries of programmers using various operating systems vary a great deal (Sedlak&Sedlak, 2014). In 2013, the higher salaries were enjoyed by programmers using the AIX operating system. More than half of them were paid a minimum monthly salary of EUR 1 663. The average earnings of people who used the most popular operating system-Windows- at work – was EUR 1 330. The

programmers using the Linux operating system earned on average EUR 96 more per month when compared to them. The lowest salaries were earned by the programmers working in the Novell system (Figure 2).

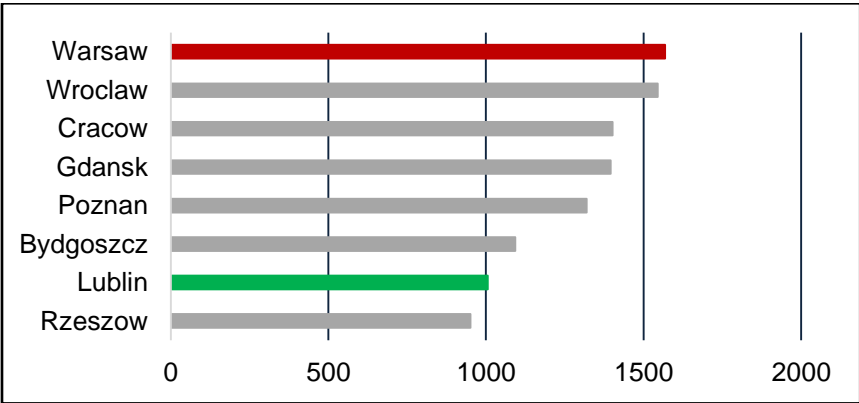
**Figure 2:** Average of the total gross salary of programmers using various operating systems



Assumption: EUR 1 = PLN 4.2081 (Central Bank of the Republic of Poland, currency exchange rate prevailing at 30 January 2015)  
 Source: Sedlak&Sedlak, 2014

A competitive salary level as compared to other major Polish cities is one of the reasons why the City of Lublin is being selected by IT companies to locate their businesses. However IT specialists are still one of the highest wage-earners in the City of Lublin. Their average monthly basic pay ranges from EUR 594 for programmers with a maximum of 2 years' experience to EUR 1 544 for programmers with a length of service above 4 years. Compared to other Polish cities, the salaries of programmers in the City of Lublin are among the lowest (Figure 3, Table 1). The average basic pay in the City of Lublin totals EUR 1 005 (Sedlak&Sedlak, 2014).

**Figure 3:** Average of programmers' gross salaries (EUR)



Source: Sedlak&Sedlak, 2014

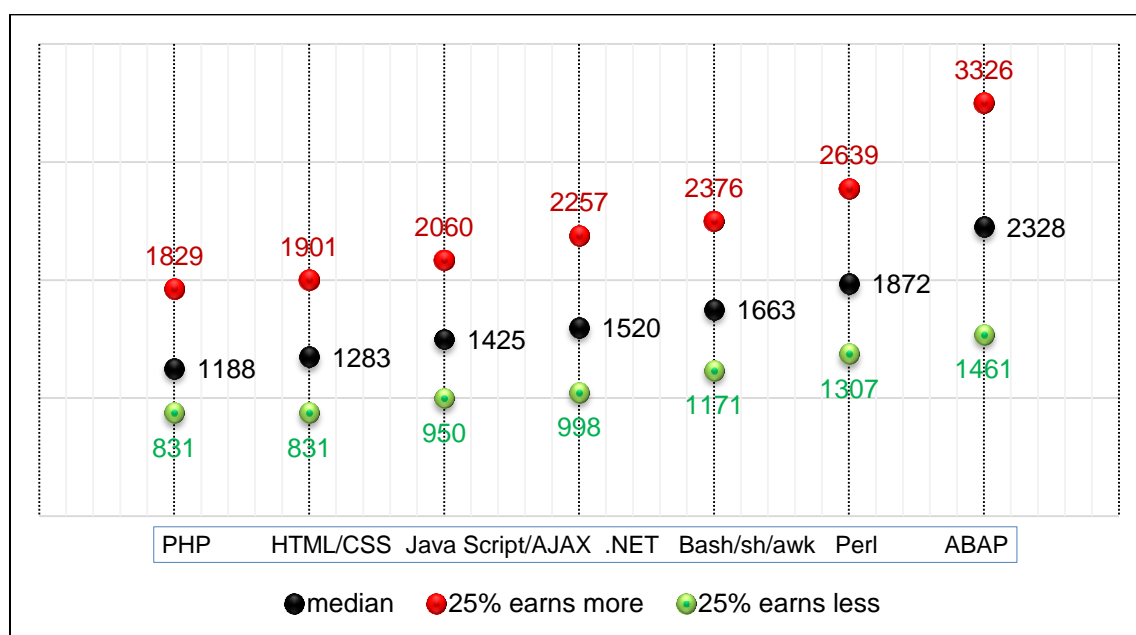
**Table 1:** Programmers salaries in the City of Lublin in EUR

Environment	Experience (years of service)	Salary (min. EUR)	Salary (max. EUR)
JAVA	0-2	594,1	712,9
	2-4	713,0	926,8
	Above 4	926,8	1 544,6
.NET	0-2	546,6	689,1
	2-4	689,1	879,3
	Above 4	879,3	1 425,8
C++	0-2	546,6	665,4
	2-4	665,4	903,0
	Above 4	903,0	1 402,1
PHP	0-2	522,8	617,9
	2-4	617,9	760,4
	Above 4	760,4	1 188,2

Source: HAYS Poland, 2013

The comparison of the salaries of programmers using various IT environments shows that the average salaries in Poland are higher than the minimum salary in Lublin; it is visible in particular in the case of the.NET environment (see Figure 4).

**Figure 4:** Average programmer's salaries in Poland (EUR)

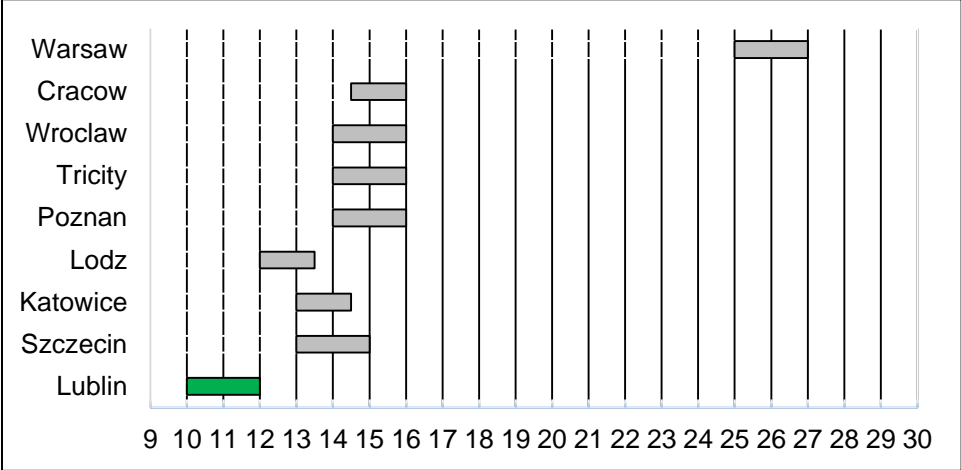


Source: Sedlak&Sedlak, 2014

### 2.3. Modern office space market

The City of Lublin is the ninth office space market in Poland – in terms of supply – and has the largest supply of modern office space in eastern Poland (DTZ, 2014). In 2014, resources of modern office space for lease totalled 139 806 m<sup>2</sup>. Along with the development of the service sector in the City additional facilities are gradually being built, mainly by local developers. For the sake of comparison – in 2013, the existing office space in Lublin totalled approximately 115 000 m<sup>2</sup>. A factor conducive to the basing of business activities in the City were also the costs of leasing office space, which in 2014 ranges from 10 to 12 EUR/m<sup>2</sup> (Figure 5).

**Figure 5:** Transactional lease fees in the office space market in Poland (EUR/m<sup>2</sup>/month)



Key: Tricity = Gdansk, Gdynia, Sopot  
 Source: DTZ, 2014; MRA, 2012.

**3. LUBLIN IT UPLAND PROJECT**

**3.1. General profile of the Project**

The Lublin IT Upland Project was established in 2012 to boost economic growth in the City of Lublin by giving support to ICT, one of the key industries of the City. The Lublin IT Upland Project is a response to the demands of the IT industry and the widely understood IT academic community. The Project is a part of a programme, which is an initiative of the Lublin City Hall used to promote the potential of the IT/ICT industry and to support the IT ecosystem in the City of Lublin. The Programme provides for partnership between local government authorities, the academic community, businesses and business environment institutions, referring to the assumptions of the *triple helix*, aimed at giving the City a competitive edge. A priority objective of the Project is to support local the IT base in the City of Lublin. The long-term objective is to develop competitiveness against other Polish cities. The Lublin IT Upland Project is implemented by the Lublin City Hall jointly with the ICT Eastern Cluster. The role of the Lublin City Hall is to co-ordinate the activities of the IT community in the City of Lublin. The Project was added to the 2013-2020 Lublin Development Strategy (Sagan & Skrzypek, 2013). The mission statement of the Project includes the strengthening of the ICT industry in the City of Lublin to the extent that the City of Lublin becomes a key ICT centre in Eastern Europe (Benefactor, 2012). The Lublin IT Upland Project objectives are as explained in Table 2.

**Table 2:** Objectives of the Lublin IT Upland Project

Overall objectives	Detailed goals		
	ICT industry	Universities	Upper secondary schools
Strengthening of the IT sector in the City of Lublin and collaboration with academic circles and the business community	To increase the number of IT and ICT companies in the Lublin market	To increase the number of students in IT departments in the City of Lublin	Stimulation of interest in the IT industry and the encouragement of young people to select IT studies
To increase the number of IT specialists in the City of Lublin	To promote and support local IT businesses among the City of Lublin population	To maintain the City of Lublin's position as a strong academic centre and "retention" of the graduates in Lublin.	To enhance awareness among the population of upper secondary students of the essence of the IT subject
To integrate IT sector businesses, academic circles and IT organisations	To integrate the IT community into the City of Lublin	To integrate academic circles and student organisations at all Lublin universities	
To enhance awareness on the IT industry's position	To support the recruitment of personnel	To upgrade IT knowledge and skills as well as the language competencies of IT students in the City of Lublin (training courses, workshops, scholarships)	
Easy and fast information flow and data availability (on students, employers, educational and research offer, job offers, office space etc.		To support local formations in the IT industry (e.g. hackerspace)	

Source: City of Lublin, 2015.

### 3.2. Activities undertaken as part of the Lublin IT Upland Project

The Project was launched on 27 February 2012 on the basis of the Co-operation Memorandum of Understanding signed with the ICT Eastern Cluster. The activities falling within the Lublin IT Upland areas of interest are presented during cyclical conferences attended by the representatives of academic circles, the business community and local government. For instance one of the regularly organised events is a conference titled "Days of Lublin IT Upland", which has the aim of promoting Lublin-based IT businesses in the student community. During the conference, a presentation is made of the current IT educational prospectus of Lublin universities for upper secondary school leavers. A series of "IT Sector Business Breakfasts" is also organised with the participation of representatives of Lublin City Hall, scientific circles, the IT industry and business institutions with the aim of integrating these communities, to exchange views and to share current problems and information about their operational activities. The Lublin City Hall jointly with a company called Infinite also organised an IT and programming competition titled "Infinite Scratch Master" for students and graduates of IT studies at Lublin Province universities, with the objective of preparing the best collection of programmes used to teach programming at primary schools.

Another activity under the banner of the Lublin IT Upland Project is also the active support of initiatives taken by student organisations and local start-up communities (including groups such as: LubCamp,

MakerSpace, Lublin Regional Microsoft Group, Aula Lublin, Hackathon, Lublin GameDev). The activities include promotion during such events such as for instance “Open Source Day Lublin”, the execution of outdoor campaigns, making billboards and posters, writing sponsored articles etc. To promote and build local community awareness, a website about the Lublin IT Upland Project was opened at the address [www.lwit.lublin.eu](http://www.lwit.lublin.eu) and a Facebook profile was established at [www.facebook.com/LubelskaWyzynaIT](http://www.facebook.com/LubelskaWyzynaIT).

The activities supporting the Project, but with a wider scope, include e.g.:

- Good to know IT – meetings of representatives of local IT companies with students,
- IT training courses/sessions – run by local IT companies (e.g. software tester/ quality assurance), IT project management – SCRUM, other methodologies Agile (finance), quality management following the Six Sigma principles etc.,
- testing of IT competencies – organisation of IT competence tests, with contributions made by local IT companies.

#### **4. THE INVESTMENT IMAGE OF THE CITY OF LUBLIN IN THE OPINION OF INVESTORS IN THE IT SECTOR**

Comprehensive services to the investors including BPO, SSC (Shared Services Centre), R&D facilities and ICT companies are provided by the Strategy and Investor Service Department at the Lublin City Hall. The Department is responsible for providing investors with all necessary information relating to investment project execution in the City, supporting co-operation with developers, help in the search of suitable office properties for investors, supporting the flow of documentation relating to the execution of investment procedures, arranging meetings with the Mayor of Lublin, City Hall departments, business environment institutions and universities; it also offers consultancy services to investors during the recruitment of future personnel and in terms of investor relations. The City Hall undertakes measures promoting the City of Lublin as a potential location for investment by ICT companies to encourage investors to their run business activities and to create conditions conducive to doing business.

##### **4.1. Opinion of the company called Trimetis**

Trimetis Testing Center Sp. z o.o., a limited liability company, was entered into the commercial register in the City of Lublin in February 2014. It is an international group with Austrian capital. The Company specializes in the delivery of IT services including software development, software testing and quality assurance (QA). Most of the above processes are performed in Lublin, however, certain tasks have to be performed at the customer's premises.

An interview carried out with the Trimetis Management on their perception of Lublin as a potential place for investment shows clearly that the City of Lublin is generally evaluated positively, though personnel shortages are becoming more and more evident, especially in the category of programmers. When selecting the City of Lublin as a place for investment, the Trimetis Management Board members used the experience they had gathered at the international corporations, where they worked previously, and which have nearshore centres in the Central European region. The positive experiences related to running outsourcing business in Poland persuaded the company to invest in Poland. A significant role was played by an analysis of personnel potential, the involvement of local government, an open-minded approach by universities and the prospects for raising financial support from European funds. From the perspective of a company with foreign capital the City of Lublin is still perceived as a city, which lacks the business environment institutions with the personnel able to provide services to English-speaking customers. Despite that, the open-minded approach of the city authorities and universities and the ongoing integration of the IT environment has created a good investment image of the City of Lublin. Trimetis took the decision to locate its operations in the City of Lublin on the grounds of many factors such as: academic potential, a base of IT companies operating in the banking and finance sector as well as an open-minded approach and the support of the city authorities and universities. Trimetis plans to work very closely with the Lublin universities following the triple helix principle.

From the perspective of an investor, the Lublin IT Upland Project is a valuable initiative and responds to the demand to draw the attention of young people in particular, to the wide range of employment opportunities in the ICT sector. The Company has expressed its readiness to contribute to Project activities though it believes that they will not translate directly into its success or failure in the City of



Lublin. From the investor's perspective, the Company considers that the City of Lublin has an investor-friendly climate, though, because of the specific nature of its business, the company does not focus exclusively on the local market. Their customers include primarily foreign corporations such as: BMW, Volkswagen, Audi, Raiffeisen Bank and Ernst & Young. The Company is in the process of adaptation to new business environment, which is a local business network. The period of adjustment in the City of Lublin is viewed positively by the company.

#### **4.2. The Opinion of the company called Sii**

Sii is a leading IT and industrial engineering services provider in Poland (Sii, 2015). The Sii scope of activities includes: software development, IT business solutions, IT infrastructure, industrial engineering and testing. Their business models include outsourcing of specialists/staffing, fixed-price projects, team leasing and manager services/maintenance /SLA. The Investor selected the City of Lublin as another good location in Poland. The executive management highlighted the key factors, which underpinned the decision about the location of the investment. These factors included the high competence base, the not too high (at the time of making the decision) competition in the IT market, competitive prices for office space and lower labour costs compared to other Polish centres. The Company management believes that the large academic base and relatively high number of university graduates of IT and IT-related fields of studies provide sufficient intellectual potential in terms of engineer and programmer availability.

Sii employs both skilled programmers with long-term experience, working with various programme languages, and junior programmers. Salaries depend on the competence profile; the average salary for top-notch programmers is comparable to other locations in Poland, even reaching the salary levels normally specific to Warsaw. Junior positions get paid slightly lower salaries than at other locations. The management believes that it is worthwhile to invest in intellectual capital to obtain a return on the investment in the longer term.

Another factor in creating a positive investment image of the City of Lublin is the availability of office space at competitive prices – the price is lower than at other Polish locations. Running a business by IT companies is related to the technical specification of office space. Sii top management listed here the drawbacks of the existing office space market in the City of Lublin. The IT sector requires specifically-equipped office space for providing the relevant infrastructure (e.g. network, technical floors, premises for technical rooms, server rooms with an appropriate load capacity, fire protection systems etc.). At present the A class office space market for the IT sector in the City in Lublin is still underdeveloped.

Before launching its business activities in the City of Lublin, Sii carried out market research in terms of the availability of intellectual capital with a profile meeting the specialist business requirements of the company. The availability of office space meeting the technical specifications and having the appropriate utilities in the building was analysed. Once the company launched its business activities in the City of Lublin it was given support by the Strategy and Investor Service Department, the City Hall, which also offered advice on the selection of an investment site, giving access to market statistics, analysis of the ICT community potential and contacts. This support also covered the area of PR. The company, after opening its branch office in the City of Lublin started quickly to hire personnel and to integrate with academic circles and the business community. In 2013 Sii organised a programmers' competition night titled "Let's Code" in 7 cities. The task given to the competition participants, divided into teams, was to create an application from a selected area of mobile, Web or other technologies. The Company monitored the development of the application prototype and the increase in code. Then the applications were presented by their creators and evaluated in terms of business usefulness, product marketing capability, technological competences and user interface and teamwork skills. It should be noted that the Lublin team received an award at the national level and all award winners were employed by Sii. In May 2015, a second wave of competitions is planned.

As of 13 February 2015, Sii employs 105 people, of which 92% are programmers, technical and manual software testers, system and network administrators, and consultants. Administrative support is provided by 8 people.

The monthly growth rate of employment in the company is on average 5-7 people. The competence gap specific to the local labour market is an insufficient knowledge of the level of English necessary to

provide services to foreign customers doing business, such as, in the banking sector, industry or the health care sector. Sii top management has actively developed a partnership with universities and the City local government authorities. The output includes the synergies of activities and undertaking initiatives under the Lublin IT Upland Project. Sii is also involved in initiatives taken by student organisations and local start-up communities.

The investment image of the City of Lublin in the opinion of the investor is business-friendly. The investment is rated by the investor as “successful”. The strategic objective for the future is to increase office space, which is required by the dynamic company growth. The Lublin IT Upland Project aimed at the integration of local government, academic circles and the business community gives the investor a feeling of being appreciated, and its adjustment in the City of Lublin, the building of networking and a target market creates added value for the economic development of the City and becomes crucial to the development of the IT sector in the City of Lublin.

## **5. CONCLUSIONS**

The growth rate of the ICT sector in the City of Lublin is very high, which is reflected in the higher-than-average growth in the number of companies in the sector. Additionally the number of graduates in IT studies shows a clear upward trend. Two extremely important conditions for the development of the sector have been fulfilled in the City. The City of Lublin’s strength is the operation in the City of two institutionalized ICT clusters. The surveyed companies plan to widen their scope of activities by adding new products or services in the next three years.

The Lublin IT Upland Project, implemented by the City of Lublin Town Hall, has successfully promoted the city’s investment potential and created a climate conducive to the development of the IT industry in the City of Lublin, which is currently the most dynamically growing sector of the local economy. The Lublin IT Upland Project concept based on the triple helix principle, based on the co-operation of public authorities, academic circles and the business community enhances the competitive edge of each entity. The implementation of the Project is to support the local IT resources in the City of Lublin through the development of mutual links between academic circles and the business community dealing with IT and ICT technologies. This is achieved through activities targeted at the residents of the City of Lublin and the Lublin Province involving the promotion of the local IT market among city residents and students, encouraging secondary comprehensive schools and secondary technical colleges to study IT, and linking IT and ICT companies operating in the City with universities and generating the mutual synergies of co-operation.

The City authorities have developed a comprehensive approach to the support of the IT sector in the City of Lublin. This is one of the priority sectors for the local economy. The Project’s primary objective includes securing qualified and ambitious personnel for the companies and to retain the best human resources in the city. In order to diagnose the needs and development directions of the local ICT environment, a report was developed, which provides feedback on the need to support companies in building competitive advantages in the human resources (HR) area. Creative workshops were also organised for the heads of HR departments on how to retain IT specialists in the City of Lublin. This allowed, on the one hand, further integration in the community, and on the other hand created an opportunity for working together on a set of answers and solutions available for use as well as the active promotion of the City in the European investors’ market also through the participation of the City of Lublin in CeBIT 2013 trade fairs in Hanover (Outsourcing&More, 2013).

It can be argued that the most important asset of the City of Lublin are people – intellectual and social capital, which enables the creation of innovative solutions. It is a huge potential for business, which is supported by the increasing number of businesses entering the Lublin market. A bargaining chip of the market is the competitive costs of office space, the availability of human resources and the academic base. The Lublin IT Upland Project adds dynamism to the development of the ICT industry. The IT sector in the City of Lublin has adopted the form of Lublin IT Upland, which in the last couple of years has ceased to have only geographical associations with the Lublin Upland. Similarly to Silicon Valley in California the Lublin IT Upland is the result of the dynamic growth of a sector of the economy defined by the profile of the terrain. Thanks to the involvement of 3 communities: business, academic and local government it has been possible to take advantage of the Lublin Upland potential and to transform it into a major IT centre.

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