THE ROLE OF ICT SECTOR IN CREATIVE INDUSTRY IN ŽILINA REGION

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Abstract: Creativity is typically thought of in the singular – as an attribute. This paper looks at the way creativity itself is being transformed in ICT sector. To be effective in innovation efforts, ICT sector has to take into account the nature of the strategy and organizational processes of innovation as a mixture of creativity, irrationality and feasibility. ICT sector is a rapidly changing sector. This paper also answers questions on the subject of enhancing the creativity in ICT sector, environment supporting creativity in ICT sector, relation of creativity to knowledge and expertise in ICT sector, the role of ICT sector in creative industry in Žilina region.

Keywords: Creative economy, Creativity, ICT sector, Žilina Region.

1 Introduction

Over the last decades Information and communication technologies have enabled changes in people's lives. ICT has been taken up in public services such as government, the health sector and educational and training (Osimo, 2008; Ala-Mutka, 2008; Punie, 2008; Redecker, 2008).

To be effective in innovation efforts, companies have to take into account the nature of the strategy and organizational processes of innovation. Innovation activities are a mixture of ***creativity,*** *irrationality and feasibility*. (Huizenga, 2007). Creativity is an integral part of innovation. This is the main reason, why the creativity in ICT sector is look over.

Mayer's (1999) review of seven definitions given by authors contributing to the 1999 'Handbook of Creativity' (Sternberg, 1999), provided the following definition of creativity: "[…]creation of new and useful products including ideas as well as concrete objects." A more recent, albeit unsystematic, review has confirmed the importance of this definition (Andreasen, 2005). Thus, in Zeng et al. (2011) "creativity is broadly defined as the goal-oriented individual/team cognitive process that results in a product (idea, solution, service, etc.) that, being judged as novel and appropriate, evokes people's intention to purchase, adopt, use, and appreciate it."

Authors trace the role of ICT sector in creative industry in Žilina region, as well as relationship between creativity, knowledge and innovations in this article. A number of studies have investigated creativity in many industries, but the sector of ICT is different and special for its rapidly changing development. In the sector of ICT, in comparison with other industries, it is much more important and even natural to be creative. In this article, authors analyze the place of ICT in creative industries. For the purpose of this survey, there has to be the interconnection between ICT sector and creative industry defined. Section 2 provides an methodological definition of the ICT sector in the Slovak Republic. Authors has described the data, researched questions in Section 4 and also has reported the principal results in Section 5. Discussion and conclusion follow.

1.1 The interconnection between ICT sector and creative industry

The creative industries have all the characteristics of high-tech industries. They demand a diverse mix of skills and are likely to gravitate towards urban areas that either have or are acquiring the institutions and other attributes to meet the labor requirements of the creative sector. They require a well developed ICT infrastructure to serve their clientele, and interaction with and IT manufacturing base to create and target their products. (Yusuf, Nabeshima, 2005)

The ICT sector is a heterogeneous collection of industry and service activities, Internet service providers (ISPs), libraries, commercial information providers, network-based information services and other specialized services (Mansell, Wehn, 1998).

Creative subsectors, such as electronic games, depend upon local and international networking in order to develop commercially successful procudts and to enhance their market prospects. The forward linkage is assessed to be significant if the source industry accounts for at least double the economy average – 0,7 percent of the purchasing industry´s total goods and services inputs. The linkage is considered strong, if this dependence is at least 3 percent. (Yusuf, Nabeshima, 2005)

As can be seen in Table 1, in score of Global Creativity Index (GCI) for 2011, Slovakia placed the 41st place. The best score in this indicator has got Sweden. Finland is the best in Talent and Technology. Finns worsened indicator Tolerance towards ethnic and racial minorities and against homosexual people. The most tolerant nation in this study is Canada.

Table 1 The Global Creativity Index

Total rank	Country	Technology	Talent	Tolerance
1.	Sweden	5	2	7
2.	United States	3	8	8
3.	Finland	1	1	19
21.	Austria	13	30	35
26.	Hungary	33	25	34
29.	Czech Republic	25	31	49
41.	Slovak Republic	36	33	55
41.	Poland	37	29	58
49.	Ukraine	34	27	77

Source: R.FLORIDA – CH.MELLANDER – K.STOLARIEK: Creativity and Prosperity: The Global Creativity Index, Martin Prosperity Institute, September 2011. [online]. [cit.2012-01-20]. Available online: /http://martinprosperity.org/media/GCI-Report-reduced-Oct%202011.pdf

Quah (2002), emphasizing demand over supply, argues that the Information and Communication Technology (ICT) revolution is fostering improvement in labor skills, consumer sophistication, and an increased level of broad-based education. This encourages the improved use of technology and raises labor productivity and as a result, "**drives economic growth, one way or another**" (Quah, 2002, p. 22). Levine (1997) argues that relaxing barriers to information access that **ICT is believed to be an important driver**, promotes faster growth by encouraging increased investment. The link between investment in information technology and growth has been investigated by a wealth of studies. (Kguong, 2011).

Slovak Republic (Slovakia) is one of the moderate innovators with a below average performance. Relative strengths are in Human resources and Economic effects. Relative weaknesses are in Open, excellent and attractive research systems, Finance and support, Firm investments, Linkages & entrepreneurship, Intellectual assets and innovators. High growth is observed for New doctorate graduates and Community trademarks. A strong decline is observed for Non-R&D innovation expenditure and License and patent revenues from abroad. Growth performance in Human resources, Open, excellent and attractive research systems and intellectual assets is well above average. (European union, 2012)

2 Methodological definition of the ICT sector in the Slovak republic

In order to consider the role and signification of Information and communication sector (farther ICT sector) we have to go out from the available methodic that defines this sector, used for the demands of economical statistic. Unitary Eurostat NACE rev 1.1 methodology was replaced by NACE methodical rev. 2 in year 2008. There had been used OKEČ methodology, which met classifications NACE rev. 1.1. (in modified version accommodated to domestic conditions) till 2007 in Slovakia. While the IT services were acknowledge as a part of services sector (category K, real estates, rent and trade services) by OKEČ methodic, methodic NACE rev. 2 acknowledge IT as an independent sector. This significant methodic change presents major problem by comparing of former economic development sector. (See Figure 1)

The only exception is presented by divison of telecommunications, which ooccurs in both methodics in a separate form.

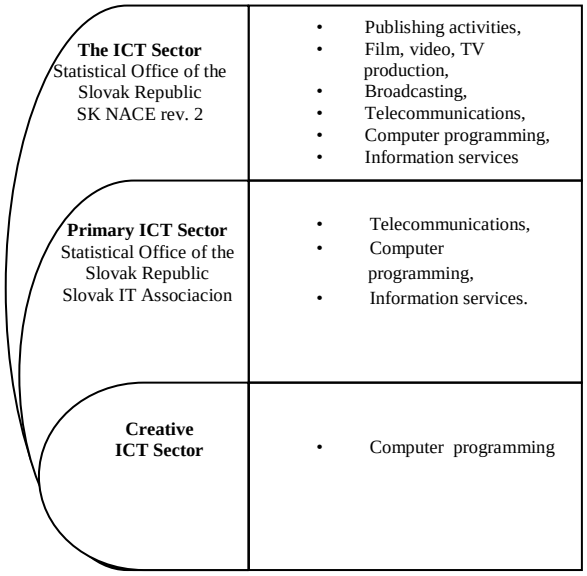

Figure 1 Methodological Definition of ICT Sector, Source: Author

Both forms were used by statistic agency to check infomations only in the year 2008 due needs of short term predictions. National invoice, a savoir GDP or brutto added value, that are key factors to determine single sectors of economy, are still allocated in OKEČ methodic. This fact does evocate problem by a accurate quantification of ICT sector in a way defined by NACE rev.2. (Slovak IT Association, 2011)

Statistic definition of ICT sector through NACE and OKEČ includes merely companies, which allocate activities related to ICT as a main activity. Statistical reporting is made according to companies location, in separate regions, what makes the situation in some cases significant misleading. Several big companies are located in Žilina region, but many of them are not statistical reported, due a fact of their headquarter location in other cities.

These days ICT specialists works in every kind of enterprise unit, presenting a group of very creative employees creating SW solutions for specific situation. The sector of ICT is a common platform for all sectors (education, medicine, public administration etc.)

2.1 ICT sector in Žilina Region

Žilina´s self governing region has a surface area of 6788km2 with population of 693499 inhabitants. The region shares 9 borderline checkpoints with Czech Republic and Poland.

The Žilina region can be considered as industrial and with a high potential for development, primarily because of two facts: its location near the industrial areas of the neighbouring Czech Republic and Poland and its lack of fertile soil. Industry represents 72% of the region's annual turnover. This includes all the sectors and is equally distributed.

The development of the ICT sector in Žilina Region occurred mainly after 1990, when computer performance was already at a higher level. Czechoslovakia was connected to the global internet network in 1992. Especially because of internet, but also thanks to the rapid development of hardware and software, this year could be identified as a milestone in the development of new companies. From the primary ICT sector there are most active players operating in the field of computer programming, which is the sole regarded as a creative one. (See Figure 2)

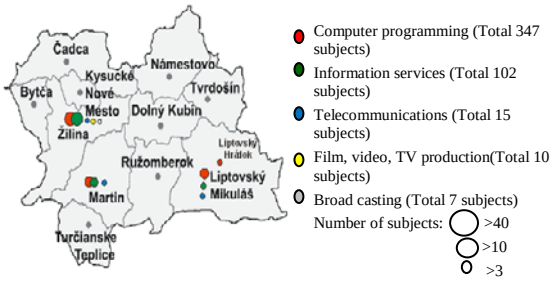

Figure 2 ICT Subjects operating in Žilina self-governing region, Source: Author

3 Materials and methods

Whereas primary research was set to be interview, twenty leading companies of the ICT sector in Žilina Region were asked to participate. With a starting point of elaborating partially standardized questionnaire, there were suitable respondents selected.

Respondents were employees of selected companies operating in ICT sector, division 62 – Computer Programming according to the SK NACE rev. 2 classification. (See figure 1) This division is considered to belong to creative sector. The questionnaire consisted of 30 questions and the survey focused on three main areas: Innovation, Finance, Creativity and Impact of external environment. Seeing that respondents disapproved to be named and asked for anonymity of their company's name, answers are evaluated as anonymous. Since it is impossible to cite all respondents with their answers, all responses were processed and there was a summary of all answers created.

Primary research was conducted from September 2011 to April 2012 with the main aim to answer research questions. The formulation of research questions followed on secondary research – the study of literature and analysis of the current status of ICT sector in Žilina Region.

4 Research and research questions

The research questions are follows:

RQ1:*Who is the creator of creative ideas?*
RQ2:*How can the environment be designed to support creativity in ICT sector?*
RQ4:*What is the relation of creativity to knowledge and expertise in ICT sector?*

For the reason contribution is limited by the number of pages, presents just the brief evaluation of the questions of the questionnaire.

71 % of respondents pointed that companies they work for do not have a separate creative department, so 29 % of respondents work for a company which built a separate creative department. The level of innovation activities and creativity in companies

depends on customer requirements. Customer is the main impulse for making decesion to create innovate products and services. In second place it is a competition, rapid development of new technologies in ICT sector and up-to-date trends in this branch, but also new funcionality of applications and impulse coming from the company's management. Employees are seen as innovators with creative ideas. They acquire new ideas for creative solutions through participating in workshops, monitoring trends in the ICT sector, monitoring their competitors, market situation and running projects. In general companies in the ICT sector of Žilina Region does not cooperate within the implementation of new products or services.
Regarding factors affecting the region's ICT industry, respondents suppose that this industry is mostly influenced by dynamics of technology development and progress of IT technologies and applications. Another factor of the sector's development is the trend of overall economic development of the country but also competition, demand or new trends in marketing.

According to customers the government of Slovakia does not support ICT sector sufficiently. Some respondents think that the government is more focused on other sectors, mainly on automotive industry.

In respect of negative factors affecting employees while developing creative ideas, the main factor was found to be stressful working environment. Other negative factors affecting the employees in creating ideas include:

- Too rigid environment (stark working environment),
- Deadlines,
- Constant supervision by management and managers,
- Pressure from the side of the employer,
- Rush at workplace,
- Bad relationships with other employees,
- Unkind working atmosphere,
- Negative thinking,
- Misunderstanding and criticism from management,
- Creative ideas generate only in a home company, while there are employees in a Slovak affiliated branch only working with them and do not even have to think creative.

Strengths	Weaknesses
▪ Plenty of university graduates and experienced IT professionals in the region who are lower remunerated than graduates and experts abroad, ▪ Existence of innovativeness in the industry and talents in companies, ▪ Constant development of the industry and new technologies, ▪ Information literacy of users, ▪ Good availability of internet in the region.	▪ People have low awareness of ICT products and their use, ▪ Strong competitors on the industry, ▪ Weak competitiveness in developing new technologies.
Opportunities	**Threats**
▪ Possibilities of education in 'perspective' fields (Java, C++, MS Visual Studio), ▪ Development of unknown technologies, ▪ Increasing awareness of people about the field of ICT, ▪ Employing of young people who can bring new ideas, ▪ Investments, ▪ New trends in ICT	▪ People are too dependent on technologies that reduces their ability to solve problems independently, ▪ Entry of new competitors into the industry, ▪ Threat of losing know-how and competitive advantage.

Figure 3 SWOT analysis of ICT sector in Žilina Region, Source: Author

Regarding question about education, all respondents answered equally, and that all employees should be educated in the field of company's business activities. When introducing new products/services it is not necessary to neither carry out special training nor hire new experts because all employees involved in new innovative solutions are experts in their field. On the other hand, we can state that these employees continually have to learn new things. All companies that participated in the survey have close relations and cooperate with the University of Žilina.
Respondents were asked to identify strengths/weaknesses and opportunities/threats of the ICT sector. These can be seen in figure 3 .

5 Results

From the basic analyses and research regarding information-communication technologies in Žilina region following can be stated: although this branch doesn't belong among the regional dominancy, it still cannot be considered gutless. In term of human resources, this sector offers lavish sources of experienced experts, skilled in technical and technological procedures. These experts must face to various demands from customers and company management. Seeing a fact, that creativity is hardly to measure, we can only guess the level of creativity in companies placed in Žilina region. The Majority of companies are running in a non innovative and non creative mode, but they are still classified as "creative companies".

Likewise, statistics and branch classifications include employees of above mentioned companies performing without any sense for creativity. Employees such gate keepers, cleaners, clerks etc., are employed in a creative company and are included into employee figures but these do not perform this kind of creative work. Due this fact it is complicated to state the correct figure of employees involved. A recent survey exposed following conclusions related to survey questions.

RQ1: *Who is the creator of creative ideas ?*
The main motion regarding decision by innovation of products and services – to be creative comes from the side of customers - demand. The Second source of the main motion are competition and effort to be competitive, sustain tempo in steadily changing conditions, followed by employees and last but not least the management of the firm.

RQ2: *How can the environment be designed to support creativity in ICT sector ?*
The major factor influencing IKT sector is a rapid development of technologies and applications, not less important factor of macro environment is an economic process. In term of macro-environment it is also a rapid changing competition, demand and market inquiry. Unthinkable part of IKT sector support should be guaranteed by the state. The most significant factors influencing working conditions are stress, misunderstanding and critique from the side of company management.

RQ4: *What is the relation of creativity to knowledge and expertise in ICT sector ?*
Education as well as high level of knowledge present an unthinkable part of every employee operating in IKT sector, whose the main role is to think creative and create a creative product. It is possible to get a creative idea without knowledge , however the knowledge is important for the realization of the creative idea. The very process of realization presents the major task of employees operating in sphere considered be creative within the frame of IKT sector (See Figure 9)

Žilina is a large city, which offers a wide scale of self realization opportunities. Moreover, Žilina can be considered "wealthy city" concerning human resources, whereas University of Žilina becomes the major source producing alumni in a field of technique and technology.

Figure 4 compares definitions of creativity (Mayer's 1999, Sternberg, 1999, Andreasen, 2009, Piffer 2011) with attributes of creative product in sector of ICT. If the creative product will

meet all attributes within the range of creativity and attributes, determined from the results of research, this product can be defined as a creative product.

Attributes of Creativity (Mayer's 1999, Sternberg, 1999, Andreasen, 2009, Piffer 2011)	Attributes of Creative Product in ICT Sector
Novelty,	Novelty,
Imagination,	Appropriateness/Usefulness,
Appropriateness/Usefulness	Effectiveness/Functionality,
Differentiation from standard,	Economic Efficiency,
Applied into practice	Intellectual property.
Economic Efficiency	**High level of knowledge,**
Intellectual property	**Value added**

Figure 4 Attributes of creativity vs. Attribute of Creative product in ICT Sector, Source: Author

6 Discussion

Creativity is in a peak season. This term in nowadays used to define internally diverse group of economically active people engaged in inventiveness and new ideas. Core parts of creative industry are architecture, design, film, media, software, fashion design, music and art. For creative industry there is a group of enterprising people essential; these people primarily use creative ideas, talent and new ideas at their work.

According to The Economist Intelligence Unit study (eTrend, 2012) Slovak local firms are not an important source of product innovations, while they do not possess necessary structure, processes and global thinking as well. This tends to be the biggest source of possible reserves of restructuring of the Slovak economy. Education, governmental support of infrastructure development and labour market policy are linked to the support of innovative companies.

Actual mapping of creativity in ICT sector distorts disunited definition of the sector which is a starting point for making statistics. This inconsistency in the definition of ICT sector significantly distorts in the positive or negative way realized secondary research.

The initiative to creative activities has to originate from creative people, but also should be supported by the government. The role of government and regional institutions is to create appropriate conditions that would lead to creation and development of creative ideas. It is necessary to ensure that the education system encourages young people to develop their creative skills and talent. It is also necessary to ensure that creative start-ups have access to financing for their investments. We cannot forget about the sensitive area of intellectual values which creative sector generates.

As the primary research was not conducted in all companies in the Žilina Region, but only on a selected sample, results of the research may be considered as a screening analysis of the current status of the ICT sector in the field of computer programming. The realized research was the first of the planned surveys. Authors plan to carry out the survey on a wider sample of respondents in the future, not only in the Žilina Region but in the whole Slovakia because of making comparison of nationwide state of ICT sector especially in the field of computer programming which is considered to be creative.

7 Conclusion

Day by day, information and communication technologies has become an inventible part of modern life. Advanced programs and applications promise promptitude, novelty and docility. Technical advance aims forward with a sky-high velocity and employees that produce programs and applications don't keep up emit new ideas and creative solutions.

This article exposes issue of creativity in information and communication technologies. In a pure theoretical way article specifies attributes of creative product in IKT sector.

Occasionally terms creativity and innovation are falsely commuted, but in fact these terms cannot be considered not even as synonym due their different meaning. To be creative means own an idea that is original, new, forming and creating something. In a field of innovation we call entitle such idea as invention. True meaning of invention can be characterized by spending money to achieve generation of ideas. Innovation is a process, by which money are generated from the very ideas.
Thomas Edison was an innovator, earned a huge profit from his ideas. On the other hand Nikola Tesla was a contriver, he used all his money and minds to achieve inventions, but he never gained financial profit. Contriver creates creative ideas. Innovator make this ideas applicable. (Improvements, 2010)

Both, contriver and innovator are needed to be under one roof to achieve highly qualitative products considering inquiry with 100% level of knowledge, acquirement, benefit and added value. The new symbiotic and integral (holistic) approach assumes that without an appropriate use of ICT for development funds will not be used efficiently and vital sectors such as an education and health will not be able to adequately provide their benefits. A fundamental shift is required in a view of the marginalized regions, countries and population groups in terms of global economy.

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Primary Paper Section: A

Secondary Paper Section: AH