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Creative and Knowledge Society

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The aim of the *Creative and Knowledge Society* journal is to be recognized worldwide as one of the leading forums of discourse for human creativity, extending across different disciplines, whilst providing substantial contributions ranging from scientific research to innovative approaches addressing new, controversial, and potential developments at the interface between creative society and related fields. The journal's central idea is to enable great variety of ways how to challenge, facilitate and protect potential in creative and knowledge society.

Creative and Knowledge Society is an international scientific journal publishing original scientific articles and scientific studies based on theoretical and empirical analyses. The journal is comprised of main and related section:

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Articles are welcomed from all parts of the world. If possible, article should demonstrate theories, report empirical and analytical research, present critical discourses, apply theories to case studies, and set out innovative research methodologies.

The journal publishes two issues annually; one in the spring (July) and one in the fall (December).

The journal publishes independently peer-reviewed original full-length research articles, review articles and book reviews.

All views expressed in the *Creative and Knowledge Society* journal are those of the authors only and do not necessarily represent the views of the Pan-European University, the Editorial Board, the staff, or any associates of the journal.

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Formulating new policy for the creative economy in Slovakia

Emile M. Roest, Alena Dudekova

Abstract

The purpose of the research is to understand formulation of policy for creative industries, and in particular the importance of quantitative and qualitative data or information for formulation of the first policies for creative industries at national and regional level. The goal of the research is to assess whether it is possible to draft useful policy for the creative industry without having specific quantitative data at its disposal, which is often the case when such policy is being newly developed. The methodology used is a brief literature review, and a case study. The case study regards policy development for the architectural sector in the East-Slovak region of Košice, which was executed by the authors in the context of the assignment to draft a strategy for development of the creative economy of the Košice region. Statistical data presented in this research were generated in the context of that assignment. The authors found that in the case of Slovakia and the region of Košice, the availability of data on the creative industries as a new policy area is very limited. Both at national level and at regional level, qualitative data and information are most useful for formulating policy. This is possible among others because qualitative needs' assessment is feasible; international literature and best practices provide a guideline for formulating policy; and because general policies can address specific requirements through demand driven projects. The implication of the research is that specific quantitative data on the creative industries does not need to be considered a conditio sine qua non for drafting and implementing policy for the creative industries. Quantitative data will be necessary for evaluating outputs and impact of policy, in terms of efficiency and effectiveness of public spending. The choice of indicators, and collecting, processing and interpreting of quantitative data shall be an integral part of the policy to be implemented.

Keywords: *Creative industries, Industrial policy, Regional policy, Architecture, Public procurement*

JEL classification: *R58, Z18, H57*

Introduction

The purpose of the research is to understand formulation of policy for creative industries, and in particular the importance of quantitative and qualitative data or information for formulation of the first policies for creative industries at national and regional level. The goal of the research is to assess whether it is possible to draft useful policy for the creative industry without having specific quantitative data at its disposal, which is often the case when such policy is being newly developed.

The methodology used is a brief literature review, and a case study. The case study regards policy development for the architectural sector in the East-Slovak region of Košice, which was executed by the authors in the context of the assignment to draft a strategy for development of the creative economy of the Košice region. Statistical data presented in this research were generated in the context of that assignment.

The authors used statistical data from the Statistical Office of the Slovak Republic. The level of aggregation of those data differs, certain data are only available for the whole country, and other data can be generated at regional level. Another database that was used is Finstat, a private database that integrates data from various public Slovak sources, especially the tax office, trade register and entrepreneurs' register.

Beside statistical data, qualitative data were gained through unstructured interviews with professionals from the architecture and design sector in the region of Košice.

The research was executed from June till August 2016.

1. Creative industry policy: from London to Košice

1.1 Background of creative industry policy

The concept of creative economy is of relatively recent origin, emerging in Australia in 1994 with the launching of the report *Creative Nation (UNCTAD, 2010)*. The first European country that consciously developed and implemented policies for creative industry as such was the United Kingdom. As early as 1997, the British government established a Creative Industries Task Force (CITF), as a central activity of its new Department of Culture, Media and Sport (DCMS). The Creative Industries Task Force set about mapping current activity in those sectors

deemed to be a part of the UK creative industries, measuring their contribution to Britain's overall economic performance and identifying policy measures that would promote their further development. The Creative Industries Mapping Document, produced by the UK DCMS in 1998, identified the creative industries as constituting a large and growing component of the UK economy, employing 1.4 million people and generating an estimated £60 billion a year in economic value added, or about 5 per cent of total UK national income (Flew, 2012).

The DCMS developed a broad definition of creative industries. The Creative Industries are defined as "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of economic property" (DCMS, 2001). DCMS included 13 sectors in its creative industries' model, and although much has been written since on categorisation of the creative industries, the authors submit that no substantial changes to this model have been made. The 13 sectors included in the DCMS model are:

- | | |
|---------------------|------------------------------------|
| 1. Advertising | 8. Interactive leisure software |
| 2. Architecture | 9. Music |
| 3. Art and antiques | 10. The performing arts |
| 4. Crafts | 11. Publishing |
| 5. Design | 12. Software and computer services |
| 6. Designer fashion | 13. Television and radio. |
| 7. Film and video | |

DCMS's broad definition of CCIs was embraced by the academic community (see Landry, 2000; Howkins, 2001; Florida, 2002). Creativity generates from networks of creative people located in urban areas (Landry, 2000; Florida, 2002). People are the main resource of cities; their creativity is replacing location, natural resources and market access as a principal key to urban dynamism (Landry, 2000). They form a „creative class" in society (Florida, 2002), a network of professional, scientific and artistic workers whose presence generates economic, social and cultural dynamism, especially in urban areas. The creative class includes people in science and engineering, architecture and design, education, arts, music and entertainment. Creativity is the main factor for economic development, which depends on the "3 Ts" for economic growth: technology, talent and tolerance, which is needed to attract human capital in a global competition for talent (Florida, 2007).

In 2004, the UNCTAD XI Ministerial Conference put the topic of creative industries on the international economic and development agenda (UNCTAD, 2010). UNCTAD has become an enthusiastic proponent of the creative industries

as a new engine of growth in developing countries, while the United Nations Educational, Scientific, and Cultural Organization (UNESCO) has significantly upgraded its statistical frameworks to incorporate the size, scope and significance of cultural production in the global economy (Flew and Cunningham, 2010).

In Europe, the first comprehensive study that broadly reflected on creative industries was the Economy of culture in Europe (KEA European Affairs, 2006). According to that report, „the role of the cultural and creative sector ... is still largely ignored. Indeed, the move to measure the socio-economic performance of the sector is a relatively recent trend. Moreover, the exercise is a contentious one. For many, the arts are a matter of enlightenment or entertainment. That leads to the perception that the arts and culture are marginal in terms of economic contribution and should therefore be confined to the realms of public intervention. This may explain to a large extent the lack of statistical tools available to measure the contribution of the cultural sector to the economy whether at national or international level, in particular compared to other industry sectors.“ The report was the first attempt to capture the direct and indirect socio-economic impact of the cultural sector in Europe.

In April 2010, the European Commission presented its Green Paper titled “Unlocking the potential of cultural and creative industries” (CCIs) (European Commission, 2010). In line with the KEA report, the Green Paper defines the cultural and creative industries (CCIs) as follows:

- Cultural industries: industries producing and distributing goods or services that at the time they are developed are considered to have a specific attribute, use or purpose that embodies or conveys cultural expressions, irrespective of the commercial value they may have. Besides the traditional arts sectors, they include film, DVD and video, television and radio, video games, new media, music, books and press.
- Creative industries: industries that use culture as an input and have a cultural dimension, although their outputs are mainly functional. They include architecture and design, which integrate creative elements into wider processes, as well as subsectors such as graphic design, fashion design or advertising.

Compared with the DCMS model, the authors note that the British term “creative industries” corresponds to the European term “cultural and creative industries”.

The Green Paper highlights the importance of CCIs for the Europe 2020 strategy. “In order to better match the skills needs of CCIs, partnerships between art/design schools/universities and businesses, the establishment of incubator units in close collaboration with art schools and “peer-coaching” to better link professional training and practice are required.”

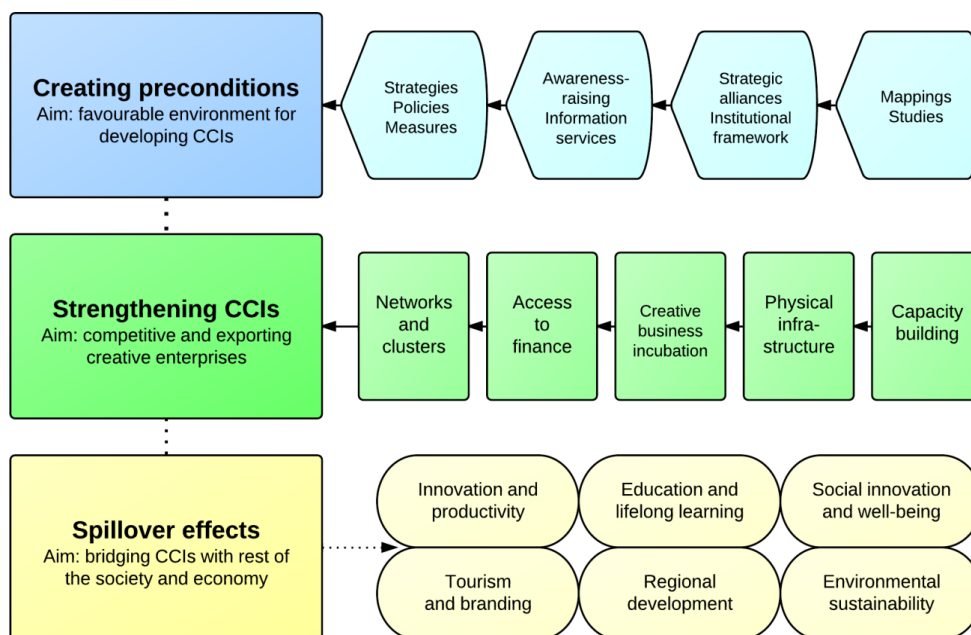
The Green Paper particularly stresses that “the local and regional dimension should be taken into consideration when developing policies and support instruments for CCIs. An integrated development model would acknowledge the contribution CCIs make to a territory’s economic development and social cohesion. Strategies should be defined at territorial levels by authorities dealing with different public policy areas together with civil society.”

Finally, the Green Paper stresses the importance of spill-over effects of CCIs on the wider economy and society. Links between CCIs and education, industry, research and administration must be maximised by creating real “creative partnerships”. Here, the Green Paper integrates the Triple Helix model on cooperation between universities, industry and government (Etzkowitz, H. and L. Leydesdorff, 1995). Recently, the Brainport Region Eindhoven transformed the Triple Helix into a Multi Helix model, reflecting the need to mobilize individual citizens or any valuable stakeholders, e.g. customers, consumers, investors, designers, artists and corporations. In this way, the connection between technology, design and social innovation should become even stronger (Brainport Development, 2015). The Multi Helix is facilitated by virtual platforms, such as Facebook and Twitter (Roest et al., 2015).

The European Commission stated that the follow up to the Green Paper would mainly happen through measures to be implemented in the context of the new EU programmes post 2013 and the flagship initiatives of Europe 2020 (European Commission, 2010).

In its conclusions on a Work Plan for Culture 2011-2014 adopted on 18-19 November 2010, the EU Council decided to establish a Working Group on Cultural and Creative Industries composed of experts nominated by the Member States. The first output of that group is the „Policy Handbook on *How to strategically use the EU support programmes, including Structural Funds, to foster the potential of culture for local, regional and national development and the spill-over effects on the wider economy?*“ (EU OMC Working Group on CCIs, 2012).

Based on an analysis of best practices and the know-how of the country experts involved, the Policy Handbook introduces a framework for developing CCIs, consisting of three main policy areas: Creating preconditions, Strengthening CCIs and Spill-Over effects.



Source: Policy Handbook, EU OMC Working Group on CCIs, 2012
Graph 1. *Framework for developing Cultural and Creative Industries (CCIs)*

1.2 Creative industries policy in Slovakia

At national level, the first conceptual document for development of the CCIs was the document „Principles of the concept for support of the cultural and creative industry in the Slovak republic“ (Ministry of Culture of the Slovak Republic, 2011). This document however presented a very general description of CCIs based on international literature, and stated a large variety of possible policy measures without an analysis of relevant data and without clearly identifying the needs of the CCIs in Slovakia (Balog et al., 2014).

In 2013, a report with more specific analyses and policy recommendations was drafted at the request of the Ministry of Culture (Neulogy, 2013). This report highlighted the importance of improving statistical data on the creative industries. It relied primarily on general statistical data (GDP and employment in the CCIs), statistical data on the cultural industries and qualitative information on the CCIs. Due to its reliance on qualitative information, it provides a number of targeted and useful policy recommendations for specific sectors of the creative industry.

In 2014, a report with more quantitative data was presented at the request of the Slovak Energy and Innovation Agency (Balog et al., 2014). That report

presented among others quantitative data on numbers of companies per sector of the CCIs, and numbers of employees. It also assessed policy abroad (best practices) and in Slovakia. One of its major findings is that public support in Slovakia is still primarily focused on the cultural sector, with almost no support for the creative industries. It further highlighted that from 8 regions, only the regions of Bratislava and Košice cover the creative industries in their socio-economic development plans. The SEIA report provides a number of correct, but rather general policy recommendations.

The European Commission already indicated, that follow-up to the (public consultation of) the Green Book would take place through the 2014-2020 programmes. In the case of Slovakia, the Integrated Regional Operational Programme 2014-2020 (IROP) includes a very general analysis of CCIs (IROP, Annex 12.28) - and measures for CCIs. IROP admits that there is a total lack of actual data, and therefore includes a special proposal for an analysis to be executed in order to set the baseline value and the target value for the indicator, the total number of full-time jobs in the CCIs. Even without such data, IROP sets a clear focus, to support CCIs in the urban centres where there is a critical mass of creative talents, enterprises, and consumers of cultural and creative products and services, meaning that mainly the regional capitals of Slovakia shall benefit from EU funding. The proposed support for hard and soft infrastructure seems useful, and shall be tailor-made through the specific requests for funding to be submitted by the regional authorities („demand driven“).

As mentioned by Balog et al. (2014), the region of Košice is the only region that has a separate strategy for the creative industry (Košice Self-Governing Region, 2011). With a view to the election of Košice as a European Capital of Culture, the city of Košice developed the Creative Economy Master Plan 2013-2015 (Bogen et al., 2014). The Plan included a comprehensive set of measures and activities, of which a considerable part were indeed executed. More recently, the region of Košice ordered a strategy for the development of the creative economy (Roest et al., 2015). The strategy analysed international trends, national and regional statistics for 11 CCI sectors. The strategy recommends the regional government to focus on soft infrastructure, by initiating and managing creative and innovative networking among artists, entrepreneurs, companies, academia, cultural and other public institutions.

2. Case study: policy for the architectural sector in the region of Košice

As regards policy making in Slovakia, it is possible to demonstrate what

quantitative data are available through a case study on the drafting of policy for the architecture sector in the East-Slovak region of Košice. For this purpose, the authors used existing data from the Statistical Office and Finstat, a private database that combines data from a variety of sources, such as the tax Office, the Entrepreneurs' Register and the Trade Register. As regards the methodology, the purpose was further to compare the sector of architecture with other sectors, to compare architecture in the region of Košice with other Slovak regions, and to assess certain international trends.

Available data at national level

For the purpose of mapping the architecture sector in Slovakia, data from the Statistical Office of the Slovak republic were used. According to the classification of the SUSR, and with respect to the availability of data analyses, data from the codes 71.11 and 71.12 were used (Table 1).

Table 1: *SK-NACE codes for architecture*

| Code SK-NACE | Name |
|--------------|--|
| 71 | Architecture and engineering activities; technical tests and analyses |
| 71.1 | Architecture and engineering activities and related technical consulting |
| 71.11 | Architectural activities |
| 71.11.0 | Architectural activities |
| 71.12 | Engineering activities and related technical consulting |
| 71.12.1 | Engineering activities and consulting |
| 71.12.2 | Geological surveys |
| 71.12.3 | Geodetical activities |
| 71.12.29 | Other engineering activities and related technical consulting |

Source: Statistical Office SR

It resulted that the following data could be generated at national level, without regional distinction, and for architecture and engineering activities together:

- Turn-over
- Average monthly nominal wage
- Number of employees

Turn-over in the architecture and engineering sector

The turn-over of the architecture and engineering sector grew over the

period 2010-2013, to a level of 1,68 billion euro. In 2014, the turn-over declined by ca. 5,5 %, reaching a value of 1 593 016 627 Euro (Table 2).

Table 2. Turn-over of selected creative sectors (x 1.000 euro, all figures rounded down)

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|--|-------------|-------------|-------------|-------------|-------------|
| Architecture and engineering activities | 1 057 961 | 1 205 626 | 1 433 405 | 1 681 523 | 1 593 016 |
| Advertising and market research | 914 819 | 1 092 725 | 1 245 793 | 1 396 497 | 1 467 818 |
| Art, entertainment and recreation | 1 289 052 | 1 473 884 | 1 677 625 | 1 736 582 | 1 861 233 |
| Information and communication | 4 457 831 | 4 891 023 | 5 186 660 | 5 434 516 | 5 613 901 |
| Editing | 347 173 | 379 876 | 401 074 | 317 262 | 358 276 |
| Movie production | 127 040 | 204 891 | 223 889 | 152 985 | 169 002 |
| Radio and television activities | 93 122 | 114 270 | 105 478 | 98 034 | 93 881 |
| Telecommunication | 2 169 189 | 2 139 265 | 2 126 078 | 2 091 869 | 2 063 669 |
| Computer programming, consulting and related services | 1 350 100 | 1 653 257 | 1 859 673 | 2 191 106 | 2 379 127 |
| Information services | 371 205 | 399 460 | 470 466 | 583 258 | 549 944 |

Source: Statistical Office SR

Average monthly nominal wage in Slovakia from 2010-2014

Over the period 2010-2014, the average monthly wage first declined, but then showed an increase. In 2010, an architect/engineer earned on average 1 018 Euro, which declined to 985 euro in 2011. From 2012 till 2014 the wage gradually increased, and reached 1.119 euro in 2014 (table 3).

Table 3. Average monthly nominal wages in selected creative sectors (euro)

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|--|-------------|-------------|-------------|-------------|-------------|
| Architecture and engineering activities | 1 018 | 985 | 1 033 | 1 101 | 1 119 |
| Advertising and market research | 1 262 | 1 256 | 1 251 | 1 209 | 1 152 |
| Art, entertainment and recreation | 630 | 640 | 639 | 630 | 601 |
| Information and communication | 1 572 | 1 736 | 1 743 | 1 762 | 1 742 |
| Editing | 854 | 1 232 | 1 198 | 1 190 | 1 155 |
| Movie production | 527 | 1 274 | 1 206 | 1 279 | 908 |

| | | | | | |
|--|-------|-------|-------|-------|-------|
| Radio and television activities | 1 651 | 1 508 | 1 546 | 1 620 | 1 599 |
| Telecommunication | 1 725 | 1 785 | 1 933 | 1 815 | 1 982 |
| Computer programming, consulting and related services | 2 008 | 1 939 | 1 866 | 1 871 | 1 784 |
| Information services | 1 446 | 1 466 | 1 468 | 1 681 | 1 750 |

Source: Statistical Office SR

Number of employees

The development of the number of employees in architects' and engineering activities has a growing trend. In 2010 there were 17.493 employees, which over time grew by 3.433 to 20.926 employees. Compared to other sectors, this sector is one of the most popular, and stands at the second place among selected creative sectors.

For analysis at regional level, the Register of economic subjects of the Statistical Office provides the possibility to assess the number of entities per region, divided also according to number of employees, and such specifically for the architecture sector.

2.1 Available data at regional level

Number of entities per region

As per the end of 2014, there are 2.651 entities active in the sector 71.11.0 – architects services. Most entities, 988 in total, are active in the Bratislava region. About two thirds less are registered in the Prešov region (325).

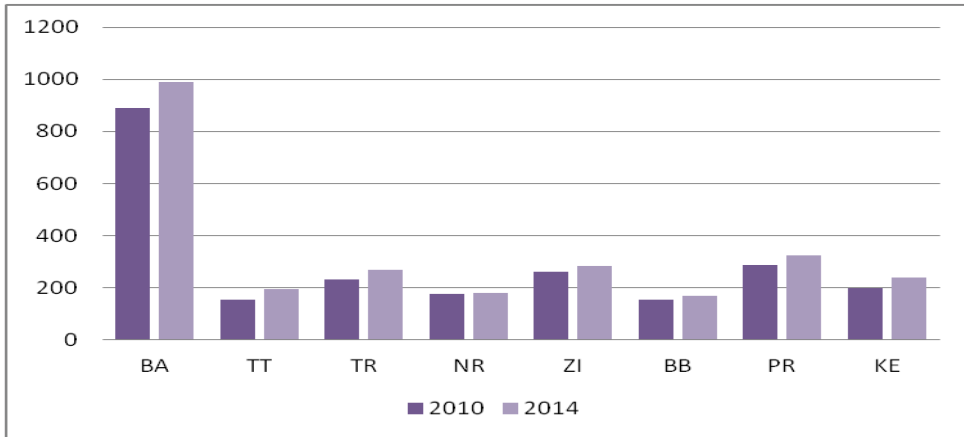
In the regions of Trenčín, Žilina and Košice the number is around 250 entities. Less than 200 entities are registered in Trnava, Nitra and Banská Bystrica regions (Table 4).

Table 4: *Number of entities per region as per 31.12.2014 (architecture)*

| SK-NACE | KE | BA | TT | TR | NR | ZI | BB | PR | Sum |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 71.11.0 | 239 | 988 | 196 | 268 | 181 | 285 | 169 | 325 | 2651 |

Source: Statistical Office SR, Register of economic subjects SR, active subjects

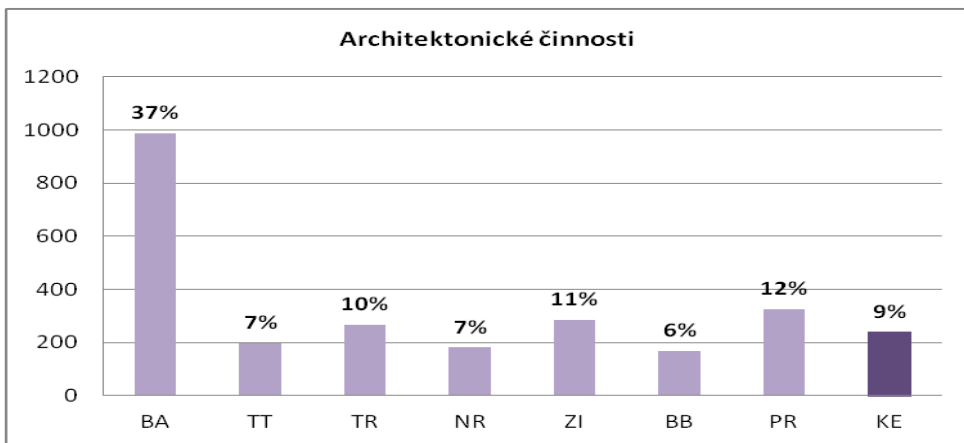
Overall, the number of enterprises in architecture grew in the period 2010 – 2014 in all regions of Slovakia. The largest growth was evidenced in the Bratislava region (Graph 2).



Source: Statistical Office SR, Register of economic subjects SR, active subjects

Graph 2: *Development of number of enterprises per region (architecture)*

Compared to the total, 37 % of architects are located in the Bratislava region, and 6 to 12 % in the other regions of Slovakia (Graph 3).



Source: Statistical Office SR, Register of economic subjects SR, active subjects

Graph 3: *Regional division of enterprises (%) k 31.12.2014 (architecture)*

Number of enterprises per region and according to number of employees

According to the Statistical Office of the Slovak Republic, companies are divided into micro-enterprises (0 to 9 employees), small enterprises (10 to 49 employees), middle-sized enterprises (50 to 249 employees) and large enterprises (250 and more employees). In the sector of architecture, 98,4 % of enterprises in Slovakia are micro-enterprises. The other enterprises are small enterprises (1,51 %) and middle-sized

enterprises (0,08 %).

Of in total 2.651 enterprises in the area of architecture, there are 2.609 micro-enterprises, 40 small enterprises and 2 middle-sized enterprises. Most micro-enterprises (969) are located in the Bratislava region, where we also find 17 small enterprises and the 2 middle-sized enterprises. For comparison, in the Košice region there 234 micro-enterprises and 5 small enterprises. The lowest number of enterprises in the central-Slovakian region of Banská Bystrica. Expressed in percentage, about 98 % of enterprises are micro-enterprises and 2 % small enterprises (Table 5).

Table 5: Regional division of companies according to number of employees as per 31.12.2014

| | KE | BA | TT | TR | NR | ZI | BB | PR | Sum |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Micro | 234 | 969 | 195 | 264 | 179 | 284 | 167 | 317 | 2609 |
| Small | 5 | 17 | 1 | 4 | 2 | 1 | 2 | 8 | 40 |
| Middle | - | 2 | - | - | - | - | - | - | 2 |
| Large | - | - | - | - | - | - | - | - | - |
| Total | 239 | 988 | 196 | 268 | 181 | 285 | 169 | 325 | 2651 |

Source: Statistical Office SR, Register of economic subjects SR, active subjects

A specific analysis of enterprises in the region of Košice shows, that there is a relatively large number of enterprises with zero employees (148 of 239 in total). Further there are 37 enterprises with only 1 employee (Table 6). This means that 77 % of enterprises have 0 or 1 employee, in other words that there is a very low degree of organisation in the sector.

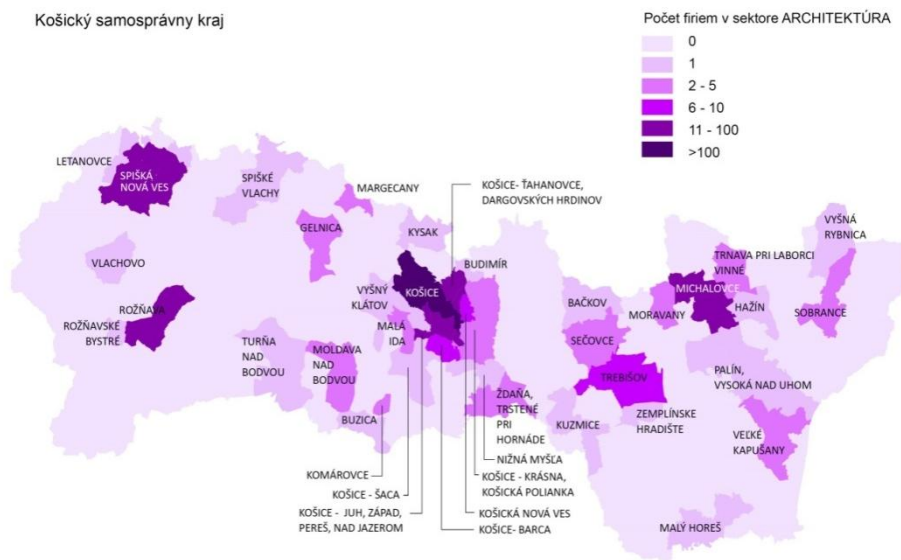
Table 6: Number of companies in Košice region according to number of employees as per 31.12.2014

| SK NACE | Micro-enterprises | | | | | | Small enterprises | | | Middle enterprises | | Large enterpr ises |
|------------|-------------------|-----|----|----|-----|-----|-------------------|-----------|-----------|--------------------|-------------|-----------------------|
| No. in | nez . | 0 | 1 | 2 | 3-4 | 5-9 | 10- 19 | 20- 24 | 25- 49 | 50- 99 | 100- 249 | 250- 499 |
| 71.11 | 25 | 148 | 37 | 12 | 8 | 4 | 3 | 2 | - | - | - | - |
| Sum | 25 | 148 | 37 | 12 | 8 | 4 | 3 | 2 | - | - | - | - |

Source: Statistical Office SR, Register of economic subjects SR, active subjects

Concentration of enterprises in the region of Košice

Analysis of the Finstat database further enables to generate locational data, and to analyse how many enterprises of the sector exist in each city (village). Not surprisingly, the largest numbers of enterprises in this sector are found in the urban centres: Košice, Spiška Nova Ves, Rožňava and Michalovce (Graph 4).



Source: data from finstat.sk; own processing

Graph 4: Concentration of enterprises per city (architecture)

2.2 Qualitative data

In addition to analysis of quantitative data and existing studies, the authors executed qualitative, unstructured interviews with four architects / designers from the Košice region. These qualitative interviews confirmed quantitative data and that qualitative information from other studies also apply for the region of Košice. In particular, the qualitative research found that there is:

- a low number of students in architecture;
- a lack of cooperation in and outside the sector;
- a large number of one-person companies;
- insufficient appreciation of design and architecture;
- public procurement that does not value quality, but only lowest price; and that

- there are opportunities related to the use of new materials and technologies, the use of information technologies (3D, virtual reality, Measuring and Regulation), the development of sustainable buildings (energy, material recycling), for both exterior and interior architectural design.

2.3 International data

As regards the architectural sector, the authors found that the most comprehensive information, that also enables international comparison, is provided by the Architects' Council of Europe. This Council executes an own survey among architects throughout Europe. The survey covers a large variety of data, most interestingly:

- Number and size of architects' practices
- Internationalisation
- Market size, value per architect

According to the annual survey of the European architectural sector (2014), the number of single person practices has increased since the 2012 survey by an estimated 22 % to in total 74 %, while the number of practices of all other sizes has fallen. This is probably a reaction to the economic crisis, which resulted in laying-off of architects who worked as employees in companies. It shows that architecture is a flexible profession which allows architects to establish alone if they are made redundant from larger practices, or if they cannot get a job.

The work of architects is international: 18 % of architects realised at least part of his education abroad. 35 % of architects considered working abroad, although only 5 % really did so. The recession in Europe has forced architects to become more active internationally, especially the large and middle large architect offices (construction advisors) from Great Britain, France, Spain and the Netherlands (among others), which are acquiring assignments in Asia, the Middle East, Africa and Latin America.

According to the ACE survey, the 2014 market volume of architect services amounted in 26 European states amounted to 14,3 billion euro, representing an estimated decline of 5 % versus 2012.

Slovakia has the second smallest market in Europe, only Malta is smaller. Even countries like Estonia and Slovenia, with much less inhabitants than Slovakia, have larger markets. The production value per Slovak architect is higher than the value in Bulgaria, Greece and Spain, but in for example Czech Republic and Slovenia the value is twice as high. Per 1.000 inhabitants, Slovakia has the lowest value, together with Bulgaria (see Table 7).

Table 7. *Estimated size of the architectural market (2014)*

| | Market size (1.000 Euro) | Value per architect (Euro) | Value per 1000 inhabitants (Euro) | Architect. Market as % of construction | Market size in 2012 (1.000 Euro) | Market size in 2010 (1.000 Euro) | Market size in 2008 (1.000 Euro) |
|----------------|--------------------------|----------------------------|-----------------------------------|--|----------------------------------|----------------------------------|----------------------------------|
| Austria | 281241 | 60482 | 33057 | 0,6 | 262774 | 256292 | 296789 |
| Belgium | 436306 | 29087 | 38942 | 0,7 | 529292 | 556280 | 327108 |
| Bulgaria | 20358 | 5988 | 2810 | 0,3 | 26792 | 46116 | N/A |
| Croatia | 44798 | 20363 | 10549 | N/A | 50235 | 64290 | N/A |
| Czech Rep. | 139458 | 17007 | 13266 | 0,5 | 153433 | 73045 | N/A |
| Denmark | 392062 | 39206 | 69672 | 1,5 | 447607 | 308697 | 356228 |
| Estonia | 16330 | 20412 | 12411 | 0,5 | 29277 | 12667 | 27524 |
| Finland | 133689 | 40512 | 24524 | 0,4 | 161704 | 117456 | 42580 |
| France | 907837 | 30464 | 13785 | 0,3 | 1254376 | 1301699 | 1103778 |
| Germany | 5047349 | 46010 | 62483 | 2,0 | 4192657 | 4094901 | 3988103 |
| Greece | 102646 | 5832 | 9338 | 0,9 | 170961 | 289623 | 294149 |
| Ireland | 90682 | 34878 | 19696 | 0,9 | 112102 | 172362 | 408855 |
| Italy | 1916761 | 12528 | 31535 | 1,0 | 2775280 | 2708910 | N/A |
| Lithuania | 22530 | 25033 | 11257 | 0,4 | N/A | N/A | N/A |
| Luxemburg | 49361 | 54845 | 89799 | 0,9 | 38264 | N/A | 31828 |
| Malta | 13050 | 20076 | 30677 | 1,8 | 15565 | N/A | 13320 |
| Netherlands | 910000 | 70000 | 56250 | 0,7 | 807000 | 976000 | 902000 |
| Portugal | 176636 | 8332 | 16940 | 0,9 | 261110 | N/A | N/A |
| Romania | 79471 | 10739 | 3985 | 0,3 | 90111 | 63551 | 112659 |
| Slovakia | 15211 | 8692 | 2809 | 0,1 | N/A | 41000 | N/A |
| Slovenia | 24874 | 17154 | 12068 | 0,5 | 42110 | 10359 | 40501 |
| Spain | 332999 | 6441 | 7160 | 0,2 | 336420 | N/A | N/A |
| Sweden | 347110 | 56441 | 35989 | 0,8 | 330785 | 356300 | 145073 |
| Switzerland | 623667 | 86620 | 76649 | 1,3 | N/A | N/A | N/A |
| Turkey | 888440 | 19876 | 13815 | 3,2 | 856591 | 960371 | 726778 |
| United Kingdom | 1978835 | 57692 | 30771 | 0,9 | 2006403 | 1955929 | 2800042 |
| 2014 EURÓPA-26 | 14340253 | 26109 | 27176 | 0,9 | | | |
| 2012 EURÓPA-25 | 14424668 | 27770 | 25870 | 1,0 | | | |

Source: ACE, The Architectural Profession in Europe 2014

Policy recommendation of ACE are to take action at all governance levels – EU, national, regional and local, in order improve conditions for the profession, especially:

- to invest in education to deliver high quality graduates, to increase the mobility of architects across the EU and facilitate cross-border service and establishment;
- to implement public procurement rules based on quality selection criteria;
- to capitalise on the need for energy efficient buildings, and the use of new materials and new technologies;
- to capture the need for aesthetic solutions for example for tourism and recreation;
- to embrace digitalisation and fully use the opportunities provided by new software for 3D design and virtual reality.

3. Conclusion

In the case of Slovakia, the creative industries are a new policy area, for which practically no specific data collection and no specific policy exist. However, the authors of IROP have used literature, policy handbooks and qualitative analysis to formulate measures that are very likely to be successful. The earmarking of EU structural funds for projects in major urban areas in the regions of Slovakia is in line with theory of Landry and Florida, who emphasize the importance of networks of creative people located in urban areas. The proposed measures are in line with the Framework for developing Cultural and Creative Industries (CCIs), and in particular cover the area of Strengthening CCIs .

Even in the case of the region of Košice, which is most advanced in Slovakia with respect to policy for the CCIs, qualitative research generated most relevant information for drafting the most recent strategy. Quantitative data mainly served to confirm what was found through qualitative analysis: that a vast majority of enterprises are micro-companies; that the highest concentrations of architects are in the district capitals; and that income per architect is limited. The policy or measures recommended for the Košice region were set in line with these findings, and focus on Multi Helix networking (Media 52 B.V., 2015), preferably through informal and virtual platforms; exchanging information and cooperating within the architects profession, but also outside, especially with the construction sector, design and ICT, and innovation projects at TUKE; and to improve public procurement.

Comparing internationally, it is remarkable that the percentage of one person practices in Europe (74%) and in Košice (77%) is almost identical. Moreover, the needs of the sector in the region of Košice largely correspond to those at the European level, as evidenced by the Architects' Council of Europe.

This reflects the fact that certain phenomena, such as digitalisation, climate change, and the need for sustainability, are global and affect all European countries. A major difference is found in the valuation of Slovak architects' work, which is one of the lowest in Europe and for example half of that in the Czech Republic. This may be connected to a lack of quality standards in the profession, lacking communication and PR by the profession, lack of respect for legislation in particular construction law in Slovakia, and low internationalisation of Slovak architects. The Slovak profession should find an answer to the question why the valuation of architects' work is so low in Slovakia.

While the success of many policy measures depends on cooperation from within the CCIs and from other stakeholders and therefore may be unpredictable, the instrument of public procurement can be directly influenced and implemented by the public sector itself. For example energy efficiency and low emission heating of buildings can be stimulated through environmental public procurement, which is being applied since the early 2000s (Arrowsmith and Kundzlik, 2009). The European Union has recently adopted new public procurement directives, Directive 2014/24/EU on public procurement, and Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors. These directives must be transposed into national legislation by April 18, 2016 and stimulate environmental procurement and procurement of innovations, including the evaluation of tenders on life cycle costs (European Commission, 2014). This provides real opportunities for the architectural sector, but special procedures and know-how are required to benefit from them in practice.

The above demonstrates that quantitative data may be important for long-term policy formulation and evaluation, but that in the case of a new policy area like the creative economy in Slovakia, useful and well-founded policy can be formulated based on mainly qualitative data and information.

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Current Issues of the Formation of the Investment Environment and Potential in Georgia

Salome Gogiashvili

Abstract

The stage of the formation and establishment of a market economy in Georgia raises the necessity for economic science to solve fundamentally different problems concerning the improvement of the investment environment and investment climate in national economy. After the collapse of the former Soviet Union, the replacement with new relationships has been quite difficult and painful in which foreign investments should play a crucial role. Issues to be discussed include the questions that explore some of the categories and the constraints of the investment climate (potential). All this leads to the relevance of the article and, therefore, determines the purpose of the article. The research process uses general dialectical methods of socio-economic research (description, analysis, systematization, abstraction, synthesis) as well as modern methods of research of economic theory (systemic, institutional, evolutionary). The scientific aim of the research is to highlight the current issues of the investment environment and investment climate in economy, to study the transformation processes taking place in Georgia during the last two decades, to conduct analysis using proper methods, to show the current social and political as well as other important processes, to generalize them and to form proper opinions. Findings based on research suggest that it is possible to speed up the process of economic development of Georgia. However, the situation will remain difficult in the region and the factors causing the recession _ instability in oil prices and the weakening of the national currency against the US dollar will still be present. In conclusion, the opinion can be formed that a stable and predictable legislative process is important for the investment environment. Therefore, all the parties that may undergo the changes should be informed and involved in every project planned by the government; At present, it becomes necessary to further extend the deregulation policy, which should include the development of financial and investment sectors and support of the establishment of appropriate infrastructure, promotion of the further development of microfinance

institutions, investment companies and funds, designing the system of investment insurance and stimulation, elimination of unnecessary bureaucracy and artificial barriers, etc.

Keywords: *Investment potential, Climate, Environment, Direct investments, Stimulation.*

JEL Classification: *B22*

Introduction

The study of the investment potential is one of the urgent problems for modern Georgia at the state as well as at the regional and local levels.

Nowadays, it is recognized that in modern conditions effective investment policy should be based on the development of the following basic principles:

- Improving the legislative provision of investment activities;
- Focusing investment policy on the strategic directions of investment programmes;
- Joining the efforts of corporations in the framework of regional investment policy in order to pursue their common interests;
- Systematic monitoring of positive and negative trends in the development;
- Creating a favorable investment climate and its improvement.

The development of the modern world is a multifaceted and heterogenous process. The processes taking place at the international level are distinguished by their inherent specificity and at the same time combine the processes occurring in various states. Political boundaries have long been overcome by capital, especially by financial capital and it should inevitably be considered to be a global benefit.

1 About the Formation of the Investment Environment in Georgia

In recent years against the background of the apparent deficit of funds increased demand for investment assets, its deficiency and obvious restrictions on its access have become one of the problematic issues. This tendency becomes relatively apparent in developing countries and in the ones with transition economies. (Gavtadze, G.2009)

In Georgia the situation was further aggravated by the war with Russia, an economic blockade, political changes, etc. Consequently, the prospects of country's future development are significantly determined by attracting real investment

resources in economy and increasing investment opportunities. At the same time, the growth of local investment potential as well as the support of inflow of foreign investment resources is considered. Formation, strengthening and growth of the investment potential of the whole country and its individual regions can play a crucial role.

The investment environment is the system of socio-economic relations that is formed on the bases of the impact of a sufficient number of interrelated processes on the micro and macro economy and leads to the motivation of a sustainable investment.

The indicators affecting the investment environment are as follows: macroeconomic parameters, financial condition, private property, debts and their services, tax regime, political risks and the danger of a force majeure and geopolitical location.

It should be noted, that among the factors influencing the investment climate the geopolitical position of the country is the only one the state cannot influence. It is formed through the geographic and global processes taking place in the world. However, the government can create appropriate conditions for foreign investors to choose one particular country from the choices given to make capital investments. The investment environment of the country implies the actual conditions existing in the country which determine intense attraction of the increasing amount of the long-term foreign capital or its decline. In other words, based on the specific circumstances, the investment environment may be favorable (encouraging) and unfavorable (impeding). Every investor considers these factors before taking specific steps. Thorough analysis of the investment environment of the country and careful consideration of risk factors is the primary task of every investor. . (Baratashvili, E. Magrakvelidze, D. 2009)

In this respect the current situation in Georgia cannot be evaluated unambiguously. In terms of developing the necessary measures to improve the investment environment in Georgia it is recommended to loosen monetary policy. Overly restrictive monetary policy hampers investing activities. It should be taken into account that in the country the accumulation process indicated by J. Keynes can be observed: investments are less than savings. (Chixladze, N. 2008)

This procedure is mainly the result of low efficiency and low investment attractiveness of the real sector. Therefore, the government should stimulate small and medium-sized businesses oriented on material manufacturing, which provides (in combination with the economy regulation using monetary methods) the revival of investment activity and will create the preconditions for sustainable development of national economy. The investment environment in modern Georgia is clearly difficult to assess for many reasons. As a rule, foreign investors are positive about the diversity of natural resources. In general, they are willing to invest significant amounts of money in obtaining and processing natural resources.

Situation is not easy concerning labor resources. Despite the fact that in terms of the demographic data, Georgia is quite highly qualified labor force on the labor market, its price is significantly low. This creates favorable conditions for foreign investors. On the other hand, it should be noted that as a result of a labor organization formed in the social conditions the workers are accustomed to the strict formal control, accurate regulation, low initiatives, etc. They are less likely to attract foreign investors by these characteristics. The nature of the economic development of the recipient country, which reflects the growth and development rates, inflation level, and the size of internal debts, etc., is very important for the investor.

2 The Factors Forming the Investment Climate in Post-Soviet Georgia

It should be noted that in attracting foreign investment Georgia has competitors. They are CIS countries, which have more success in encouraging the process of attracting foreign investment. The formation of the investment environment of the country is influenced by the following factors:

1. Macroeconomic conditions (the size of GDP, GDP per capita, GDP growth rate, inflation, exchange rate);
2. The level of export orientation (the share of manufactured products which are exported);
3. Social and political factors;

In the investment field of the country the opportunities to enhance the effectiveness of the economy are still little, but they are growing especially at the expense of attracting foreign capital. Therefore, the necessity to efficiently use these funds is expanding while the investment processes, unfortunately, remain chaotic in certain areas of the economy.

The improvement of the investment environment through the reduction of tax rates is of particular note. The new Tax Code came into force on January 1, 2005 and since then it has undergone many changes. (Chixladze ,N.2004)The major part of the changes was related to the reduction of types of taxes and their rates (Table 1).

Table 1 *Changes in tax rates in Georgia from 2005 to present*

| Taxes and Rates before January 1, 2005 | Taxes and Rates before January 1, 2008 | Taxes and Rates from 2008 |
|--|--|----------------------------|
| Personal income tax 12-20% | Personal income tax-12% | Personal income tax-20% |
| Corporate income tax – 20% | Corporate income tax _ 20% | Corporate income tax _ 15% |

| | | |
|---|------------------------------------|------------------------------------|
| Social insurance tax 31% plus 1% | Social tax _ 20% | Abolished |
| VAT -20% | VAT -18% | VAT - 18% |
| Excise _ differentiated | Excise _ differentiated | Excise _ differentiated |
| Property tax 0,1-1% | Property tax _ not more than 1% | Property tax _ not more than 1% |
| Tax for ownership of a vehicle _ differentiated | Customs tariff _ differentiated | Customs tariff _ differentiated |
| Property transfer tax | abolished | abolished |
| Fee for natural resources use | abolished | abolished |
| Hazardous substance tax | abolished | abolished |
| Tax on a motor vehicle entering Georgia and on heavy loads - differentiated | abolished | abolished |
| The fixed fee - differentiated | abolished | abolished |
| Small business tax 5% | abolished | abolished |
| Local tax that combined 7-taxes - differentiated | abolished | abolished |

By drawing up a new Code the government maximally opened the borders for movement of goods; export-import quotas were abolished and the average import tariff was equal to 1.5%. This fact contributed significantly to the maintenance of high rates of turnover under embargo as well as during the post-war crisis period. (Gechbaia, B. 2013)

Stable economic development, liberal and free market economic policies, only 6 taxes and reduced tax rates, a small amount of licenses and permits, simplicity of administrative procedures, preferential trade regimes, a favorable geographical location, well-developed and integrated transport system, an educated, qualified and competitive labor force, and many other factors create a solid ground for starting up a business in Georgian and for its successful development.

Some of the factors may seem internal but they may have a great impact on the investment climate. In this regard, special attention should be drawn to the problems of the protection of property rights in post-revolutionary Georgia. Solid guarantee to protect property rights is one of the necessary components of a liberal market economy.

It can be stated that in 2006-2007 these rights were somewhat violated when the facts of the destruction and seizure of private property became quite frequent. The view of a well-known scientist-economist Milton Friedman is in line with the 2006-20012 period in Georgia. He claimed that "in case of total control

over economy it is not difficult to interfere with the rival political forces to expand the scope of their activities." (Fridmani, M. 2001)

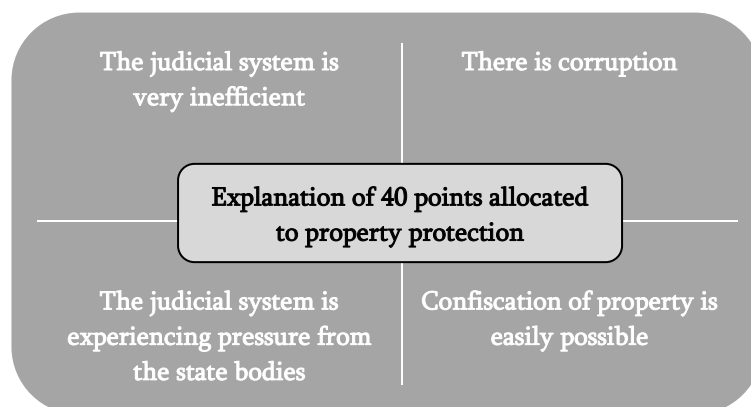


Figure 1 *Evaluation of the problem of property protection in Georgia*

According to the 2011 Index of Economic Freedom provided by Heritage Foundation in terms of protection of private property Georgia (40 points) stands alongside with the following countries: Kazakhstan, Sri Lanka, Pakistan, Nepal and Cambodia.

Obviously, this has had a negative impact on investments, and the state index has fallen in the international rankings.

3 Foreign Investments in Georgia

3.1 State Regulation of Foreign Investment

State regulation of foreign investment made in the economy should aim at two objectives according to which the functions of the regulatory organizations are also formed. (Kokiauri, L. 2012)

Table 2 *Objectives and functions of state regulation of foreign investment*

| The aim of the state regulation | Function of state regulatory bodies |
|---|---|
| Creating favorable conditions for attraction and functioning of foreign investment | Stimulation of foreign investment inflow |
| Protection of national interests from the possible negative impact of foreign capital | Control over allocation of foreign investment |

The investment potential is formed by the combination of objective conditions that depend on diversity of investment areas and facilities. The

investment potential of the state combines eight elements that can also be used successfully with regard to the region. These include:

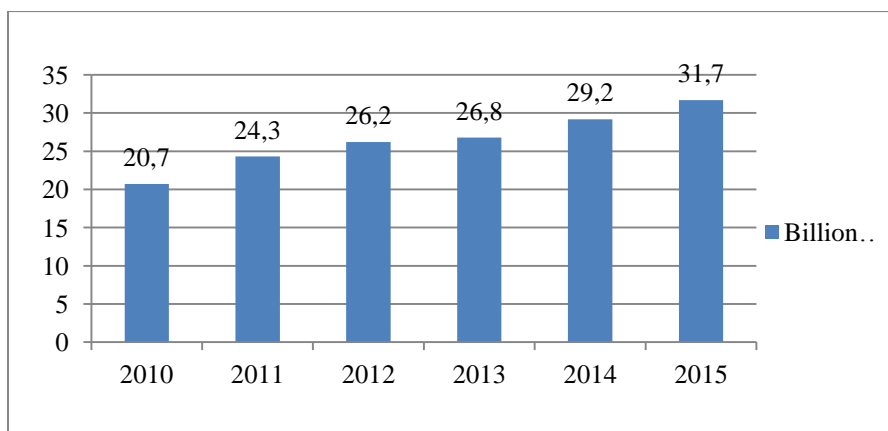
1. Commodity resources - the major commodity stocks and reserves;
2. Labor resources - labor force and education level of the employees;
3. Production potential - the overall results of economic activity of the natural and legal persons in a corresponding territorial unit;
4. Innovative potential - investments in research, education and development, technical and technological innovations and opportunities for their implementation;
5. Institutional potential - the level of development of basic market institutions;
6. Infrastructural potential - the capacity, condition of existing infrastructure and the opportunities of its use;
7. Financial potential - financial assets, reserves of companies, financial institutions, the international or other organizations of the state and in its territorial unit;
8. Consumer potential - the purchasing power of the population considering their real incomes.

3.2 Analysis of the Macroeconomic Environment and the Dynamics of Foreign Investment

Increasing the scale of investment attraction in the economy of Georgia is one of the most important tasks at a current stage. Its successful solution depends entirely on increasing the investment attractiveness in the eye of the potential investors. In this context, the main objective is the creation of such necessary conditions for the investors that will have the positive effects on investor's decisions to invest capital or to select a particular object. The object could be a separate project, the company, the city, the administrative and territorial unit, region or the entire country.

Georgia is one of a few countries in the region, which against the background of a widespread economic recession not only maintained the positive dynamic of GDP growth in 2015 but also improved it - in the beginning of 2015 the expected 2% growth reached 2.5% (if compared, at the end of 2015 in Russia a 3.8% decrease was observed while in Azerbaijan it comprised only 1.1%, and Kazakhstan experienced a 1.2% growth).

Among the neighboring countries the growth rate (4.2%) in Turkey was higher than in Georgia, but as the World Bank experts predict in 2016-2017 Georgia is expected to catch up the pace of growth of Turkey. They also suggest that our country will overcome recession earlier than others in the region and in 2018 GDP growth will reach 5%. This will be the best indicator compared to the neighboring countries.



Source: <http://www.geostat.ge>

Graph 1 GDP dynamics in 2010-2015

In 2007 Georgia received the largest FDI flow, which was 69.3% higher than the indicator of the previous year. Compared with the latter the indicator of 2012 is reduced by 1104.0 million GEL and amounts to 911.6 million USD.

The next two years after "the Rose Revolution" have not been easy for Georgia. The first years were characterized by the certain growth of the investments (compared with 2003 indicator). However, 2006-2007 were reported as the years of the investment boom. The period from the end of 2007 to 2008 was one of the worst political and economic years for Georgia (the August war and the global economic crisis). These factors turned out to be enough to minimize the scale of investments in Georgia.

The country managed to avoid serious collapse thanks to the aid of the donors allocated to Georgia after the war in August, 2008. Otherwise, the investment level the year could have been one of the lowest.

In 2012, in Georgia foreign direct investment decreased by 28% . As the domestic capital market is still underdeveloped, economic growth significantly depends on external funding sources, and in particular, on foreign direct investment.

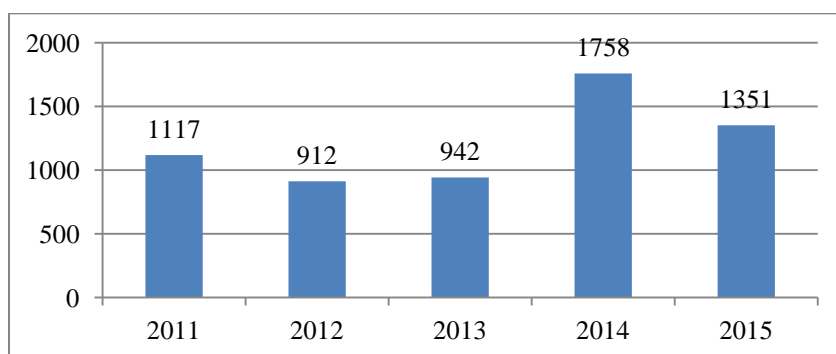
One factor is to be considered. Since 2004, there has been an increase in investments in Georgia. However, the investments were mainly directed towards the real estate and not to the reanimation and improvement of production. The money was directed to the construction, but not to the production of the construction industry. The money was spent on the creation of real estate (construction of houses, apartments, etc.).

The illusion was created that there was money in the country, poverty was overcome. The second part of the funds was used by banks to grant credits, and

once again to purchase foreign goods (mostly household and other types of appliances). Naturally, in such conditions the flow of investments could not ensure the stimulation of business and its growth.

If the dynamics of foreign direct investment will be discussed within the previous three-year period (2013-2015) their average annual rate is higher by 30% compared with the same figure of the previous three years (2010-2012). In 2014 the rate of foreign direct investments (1.7 billion US dollars) is the highest within the last 5 years.

It is important to note that this improvement takes place in very difficult circumstances - the low oil prices on the international markets and strengthening of US dollar against virtually all major currencies had dramatic impact on the world and particularly on our region. Obviously, if not the external factors the tendency of economic growth in Georgia would have been sharply upward: in the first half of 2014 a 6% increase was observed and the World Bank predicted that the average annual growth over the next few years should not be less than 5.5%. Thanks to these results, despite unfavorable general context, economy of Georgia turned out to be sufficiently sustainable and ready to cope with external shocks, and the investment environment maintained its attractiveness.



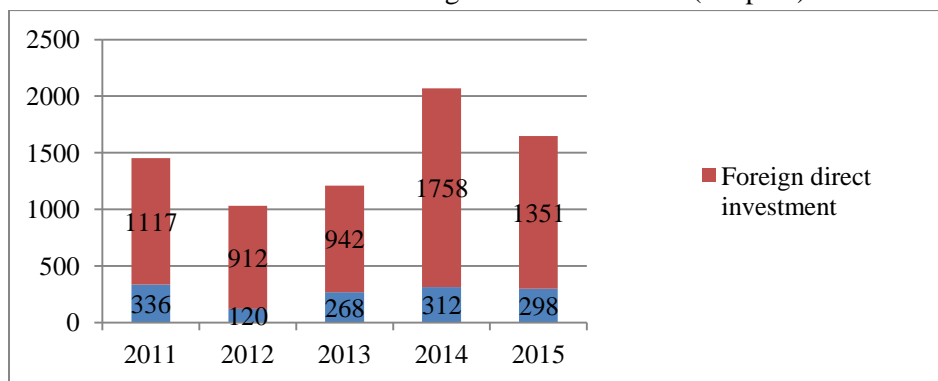
Source: <http://www.geostat.ge>

Graph 2 Foreign direct investments in Georgia in 2011-2015 (million USD)

In 2014 a great historical event took place - Georgia and the EU signed an association agreement, and later - the deep and comprehensive free trade agreement. Undoubtedly, this fact is of huge political significance. In economic terms, this means the free circulation of goods and services to half a billion consumers in the European market where GDP per capita is more than 25 thousand Euros. Moreover - for European investors it means to establish rules of the game understandable and familiar for them with regard to product quality, security, copyright protection and many other fields. For the rest of the world it means recognizing Georgia as a business hub where you can produce goods meeting European standards at a much lower cost in Georgia and sell it in Europe. The logical continuation of the process is the progress achieved in terms of visa

liberalization.

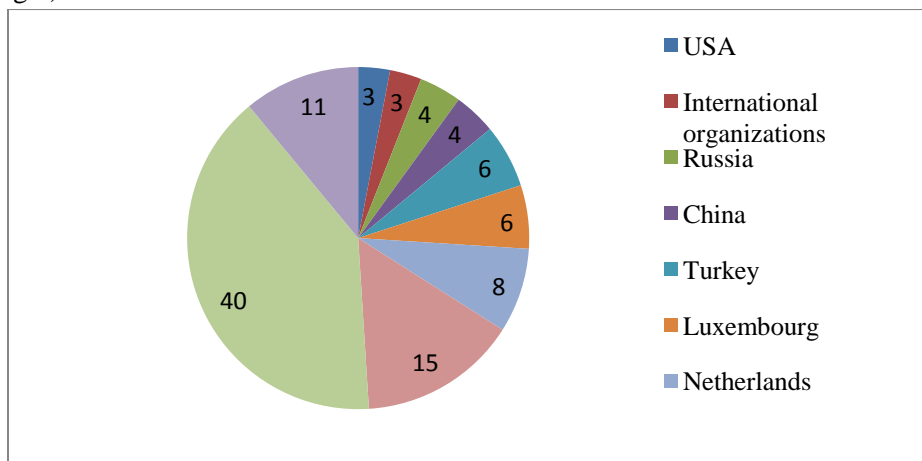
Foreign direct investment made in Georgia in 2015 amounted to 1351 million US dollars, which is 6 % more compared with the preliminary results of 2014 and 23% less compared with the revised data of the same year. Reinvestment in 2015 amounted to 22% of total foreign direct investment (Graph 3)



Source: <http://www.geostat.ge>

Graph 3 Foreign direct investments and reinvestment in Georgia in 2011-2015 (million USD)

In 2015 the share of FDI of three largest investor countries, according to 2015 preliminary data amounted to 63%. Azerbaijan occupies the first place (40%), the second - the United Kingdom (15%), and the third - the Netherlands (8%) (Fig 2).



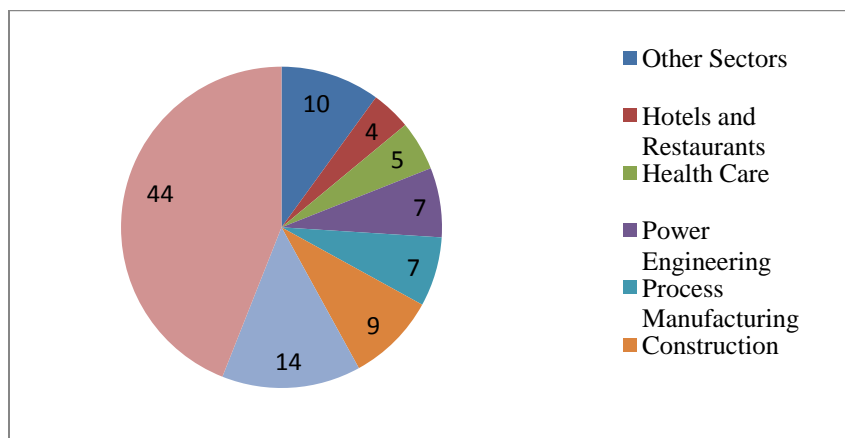
Source: <http://www.geostat.ge>

Figure 2 The share of the largest investor countries in 2015 (%)

In 2015 the share of the three largest sectors (according to FDI) comprised 68%. The largest foreign direct investment was made in the transport and communication and amounted to 594 million US dollars, which is 44% of the total

foreign direct investment. The financial sector is in the second place_ 191 million USD, while the construction takes the third place by 129 million USD (Fig 3).

A significant achievement, which can be emphasized, is the Silk Road corridor through Georgia which came into operation not only declaratively but practically _ cross-regional traffic is now active. In 2015, the Trans-Caspian railway route was opened that will unite China, Kazakhstan, Azerbaijan, Georgia, Turkey, and in the near future the European countries as well.



Source: <http://www.geostat.ge>

Figure 3 *The largest foreign direct investments according to the economic sectors in 2015 (%)*

At the end of 2015 the first goods train crossed Georgia. It will carry out the regular shipments from South Korea and China to Turkey. More recently it became known that the Ukraine, Kazakhstan, Georgia and Azerbaijan agreed on the reduction of tariffs on Trans-Caspian international routes that creates a competitive alternative to the route across Russia. All these are the individual elements of the whole process showing the privilege of a transit country.

Each investment is often the result of difficult and lengthy negotiations that last for a number of months. Therefore, the quarter and the year which will reflect a certain transaction in the balance of payments of the country is often uncertain.

Table 3 *Top ten companies by the FDI made in 2015*

| | |
|----|---|
| 1. | BF group |
| 2. | JSC Georgia Healthcare Group |
| 3. | JSC BGEO Group |
| 4. | CBD Development Ltd. |
| 5. | IDS Borjomi Georgia, LTD Georgian Branch of IDS Borjomi Beverages Company |
| 6. | Adjaristsqali Georgia LLC |

| | |
|-----|------------------------|
| 7. | TAV Urban Georgia Ltd. |
| 8. | JSC Nenskra Hydro |
| 9. | Rustavi Azot Ltd. |
| 10. | Batumi Tower Ltd |

Although the specific projects will be reflected in the statistics of the following years, their implementation was made possible thanks to the investment environment in 2014-2015. In this respect not only foreign investments, but major deals and the new projects of this period should be assessed.

The ones among the 2015 projects are as follows:

- Apart from NENSKRA HPP agreement the negotiations with Jewish investor, the company Elbit Cyclon are concluded and for the first time in Georgia the construction of high-tech material aircraft parts has started. The products will be consumed by Boyeing, Airbus, Bombardier and other well-known companies in this sector.
- A thermal power plant equipped with modern technologies in Gardabani was set up. Agreement was reached with the investor and development of several rural enterprises has started (including hidroponic greenhouse in Imereti, growing blueberries and their processing and storage in Guria, the pig-breeding complex in Kvemo Kartli region);
- The five-star "Rixos" Hotel was opened in Likani and the construction of "Best Western" hotel started in Kutaisi.
- The enterprise producing sandwich panels was built on Rustavi highway and the construction of a shopping center in the village of Rukhi has begun.
- In the Partnership Fund up to 30 projects are under discussion.

4 Discussion

A large part of the above listed projects will be financed in 2016 and in coming years. Therefore, 2016 will be better than 2015 in terms of specific investments and the perspective of economic growth. According to the recent forecast of the World Bank, the GDP will increase by at least 3% in 2016, 4.5% in 2017 and 5% in 2018. However, as it happened last year, it is quite possible that the real results will be better than the forecast.

If we consider the current and prospective projects, in 2016-2017 significant investments are expected in the field of energy, where 10 projects have already been implemented and 104 projects are under implementation. Investments will also continue in development and construction, where the level of prime cost is currently very low and, accordingly, the investment attractiveness is high. Since the flow of tourists continues to grow, the progress is expected in the hotel business and related infrastructure. I believe the start of Anaklia port project will

significantly change the structure of investment and will have a positive effect on the transport sector. The growing investment is also expected in the medical sector.

In 2016-2017 private investment will be encouraged by the increasing availability of international financial markets: if conditionally, a decade ago only one private Georgian company was on the London Stock Exchange ("Bank of Georgia"), in 2014-2015 the two companies were added ("TBC Bank" and "Healthcare Group"). According to my information, several other private groups are preparing to have their shares on the international stock exchanges or issue bonds.

At the same time, new multilateral financial institutions and banks promoting export have been added to the international financial institutions (EBRD, EIB, ADB, IFC) that have been traditionally active in our region. For example, the Asian Infrastructure Investment Bank AIIB, China Development Bank, Korea Development Agency, the Italian SACE, Export-Import banks of Eastern Europe and others. Thus, if well-structured and commercially sustainable projects are offered investors will have access to relatively inexpensive financial resources.

As for the supposed geography of investors in 2016, a further intensification of the Silk Road countries is logical to expect and in particular China, which was the leader in terms of the investment in 2014. It will try to expand its portfolio in the region. Turkey (considering the complicated trade relations with Russia) will likely try to find alternative sales channels for products through relocating its businesses to Georgia. I expect that in the next 2-3 years countries in Eastern Europe will become more active through the support of strategic investors and the banks promoting export as well as through a variety of investment funds.

The motivations of foreign direct investment are also changing that suggests that over time, the inflow of foreign direct investments will be less focused on penetration of the local market and will bring the efficiency-oriented investments forward.

Therefore, the state government should be ready in advance and at least contribute to the development of the areas, such as:

- Scientific and knowledge-based sectors;
- Secondary and higher education system;
- Training centers and training new, highly-qualified staff in those sectors that are demanded by investors.

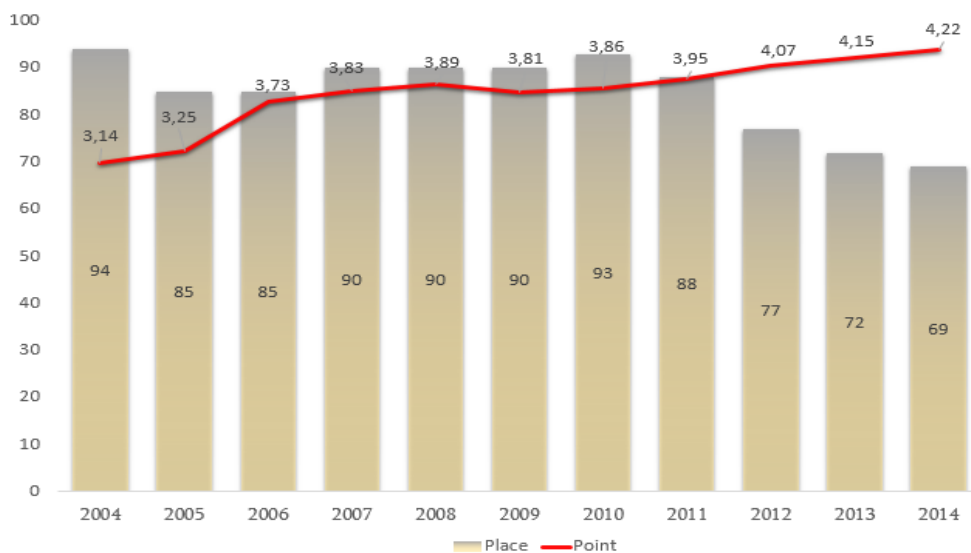
Although according to the forecast of international analysts the process of economic development of Georgia will speed up the situation will remain difficult in the region and the factors causing the recession _ instability in oil prices and the

weakening of the national currency against the US dollar will still be present. Therefore, on the one hand, a balanced monetary policy should be carried on. On the other hand, economic growth should be stimulated and all the economic policy decisions should be subject to the latter.

In this respect the government's new initiative concerning tax exemption for reinvested profit is of note. It will instantly release the resources to invest in active enterprises, while in the medium term it will encourage the opening of new companies. Suffice it to say that in Estonia, which carried out a similar reform in 2000, after 4 years, the GDP growth rate has doubled, while foreign direct investment has tripled.

Recently, health programs and other social projects have been financed by the budget. In order to withstand the pressure of the social expenditure, it is necessary to widen the income base of the budget that is to accelerate the economic growth. This will be a challenge for 2-3 years until the average annual economic growth reaches the previously estimated level of 5.5%.

It should be noted that in 2014-2015, according to the Global Competitiveness Index Georgia occupied 69th position, its rating score was 4,22 (a moderate one). Georgia has progressed 3 steps forward in the rating.



Source: <http://www.geostat.ge>
Graph 4 Ratings of Georgia by years

State investment programs should be one of the stimulating factors for

GDP growth, such as road construction, development of regional infrastructure, etc. Despite the large funds allocated in this direction the speed of the implementation is still to be accelerated.

Conclusion

Based on the foregoing, we can conclude the following:

1. A stable and predictable legislative process is important for the investment environment. Therefore, all the parties that may undergo the changes should be informed and involved in every project planned by the government;
2. The growth of investment potential in developing countries and the aim of attracting investments in the national economy on its basis can be formulated as follows: a) the necessity of restrictions on moving capital from the state; b) creating favourable environment for the growth of the national investment market.
3. At present, it becomes necessary to further extend the deregulation policy, which should include the development of financial and investment sectors and support of the establishment of appropriate infrastructure, promotion of the further development of microfinance institutions, investment companies and funds, designing the system of investment insurance and stimulation, elimination of unnecessary bureaucracy and artificial barriers, etc.
4. It is desirable, that the process of reforming specific issues important for business environment did not take too long so that the target groups could easily overcome the transitional period and take measures to adapt to the new reality;
5. The government should maximally refrain from passing such laws, which impose unjustified restrictions on local and foreign investors and hamper the development;
6. The government should refrain from making such regulations, which restrict competition on specific markets and give advantage to certain companies;
7. The work should be carried out in the following directions:: a) reaching macro-economic and political stability; b) adopting the policy for the conflict regions; that will bring the results c) supporting the production of competitive products;
8. The state government should be ready in advance and at least contribute to the development of the areas, such as: scientific and knowledge-based sectors; secondary and higher education; training centers and training new, highly-qualified staff in those sectors that are demanded by investors.

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Development And Impact Of Chinese Investment In EU

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Abstract

In this paper examines the roles and influence of China in the world and, mainly, in European Union. For a decade, Chinese investors have been looking for opportunities to buy European assets. Especially since the beginning of the 2008 crisis we observed an increase of investment activities of Chinese companies. During the crisis, cash troubled European companies due to loss of liquidity were forced to sell their shares at significant discount. Over time, with stabilizing the economic situation in Europe, European companies asset prices seemingly ceased to be cheap, nevertheless a volume of Chinese FDI to Europe continued to grow. Our goal will be detailed insight into these investments and try to identify the benefits and risks of these investments. Moreover, this paper not only provide insight into economic development of Chinese FDI but also take into account political issues and background of these investment. As far as a methodology is concerned, the basis of our work will be comparing an impact of Chinese investments in European countries and their impact on economic development in selected countries. In particular, we are interested in the behavior of Chinese investors and their motivation to buy in Europe. At the same time it will also be interested in the motives of European companies that have decided to sell shares to new owners. Finally, we will also examine ways in which Chinese investors proceed with acquisitions in the EU. Data comes from Eurostat, the national statistical offices and stock market prices. We will also be examining the political influence on these countries individually and globally, therefore as part of the EU. Based on the gained information we will try to assess the current situation of China's influence in the euro area and at the same time try to estimate its future impact. Finally, based on the detected information to analyze the results of our research.

Keywords: China, Investments, Acquisitions, Crisis

Introduction

We are entering a new era of Chinese capital. China's policy is loosening and the process of adapting of its growth model to new trends will transform the country to a driving force in global cross-border investment in the coming decade. We are witnessing China plans to triple its global assets from the current 6.4 trillion to 20 trillion up to 2020. This will have a significant impact on the host countries. Noticeable increase of Chinese investment on a global scale will require political leaders, in invested countries, impose extensive adjustments to economic policies so that they can get the most benefit from Chinese investment and also to minimize new potencial risks (Hanemann and Huotari, 2015).

The influence of China on the European Union has grown rapidly since the beginning of crisis in 2008. With the deepening crisis combined with weak euro and low asset prices create opportunities for Chinese investors to buy European companies and other European assets and government bonds at very favourable prices.

On the one hand, the supply of liquidity to the cash-troubled European companies in many cases is a positive contribution especially in terms of maintaining jobs and social securities. At the same time, the provision of funds to government budget of southern European countries in particular, helping them to avert the possibility of state bankruptcy.

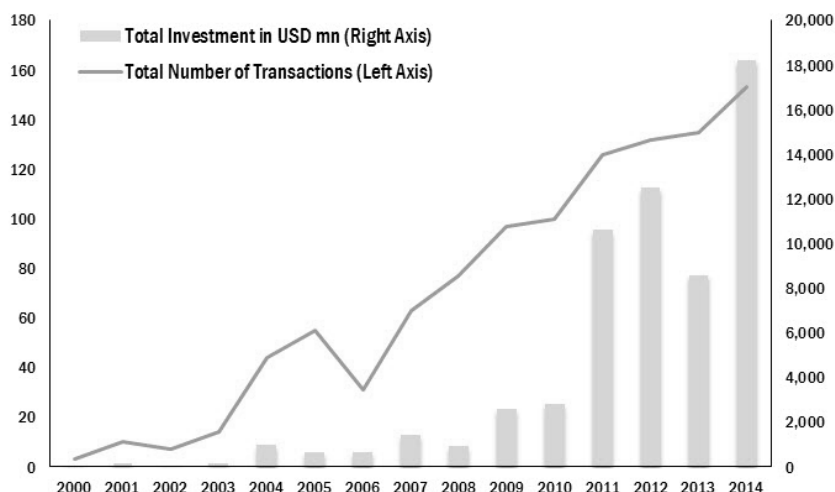
On the other hand, the size and development of the Chinese economy and its links with the global economy can pose a risk for the euro area. For example, China is one of the largest consumers of energy, particularly oil, where the drop in consumption is immediately reflected in global oil prices. Furthermore, it is necessary to think about the economic and political intentions of China. Nevertheless, Chinese money does not come for free and some return of favour is expected.

Chinese investments in Europe

As we can see in the Figure 1, Chinese foreign direct investment (FDI) into the EU in years 2000-2008 at a level below 1 billion a year. In 2009-2010, approximately 3 billion USD. In 2011, Chinese investments have increased more than threefold over \$ 10 billion. In 2014, Chinese FDI into the EU reached a new record of \$ 18 billion. While in the early stages of the recession in Europe, Chinese direct

investment were fueled by low prices of assets in the cash-trapped companies. However, even at a later stage, Chinese appetite for investment in Europe is not decreasing even when prices of assets is no longer as attractive as they were during the worst period of the crisis.

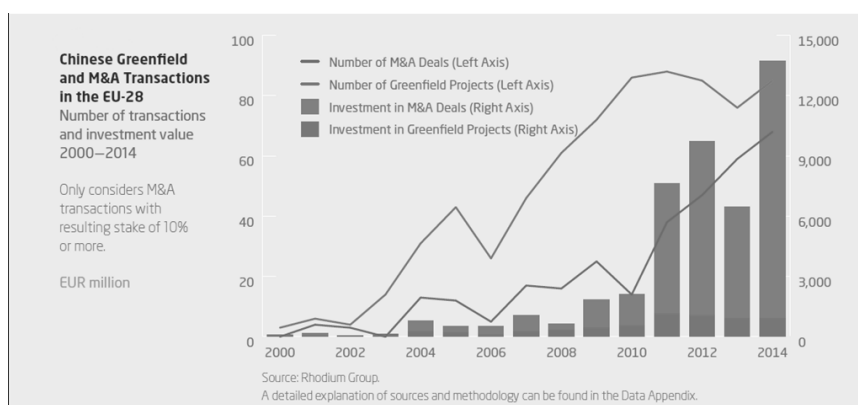
Chinese FDI Transactions in the EU-28 Economies, 2000-2014



Source: Baker & Mackenzie (Feb 2015)

Figure 1: Chinese FDI Transactions in the EU-28 Economies, 2000-2014

On the contrary, Chinese FDI is growing, the vast proportion of the investment goes to the mergers and acquisitions of existing companies (Figure 2) (Baker & Mackenzie, Feb 2015). Thus we can see that the demand of Chinese companies to invest in the EU is not just a temporary phenomenon associated with favorable asset prices. In other words, we are witnessing a new trend of Chinese investment.

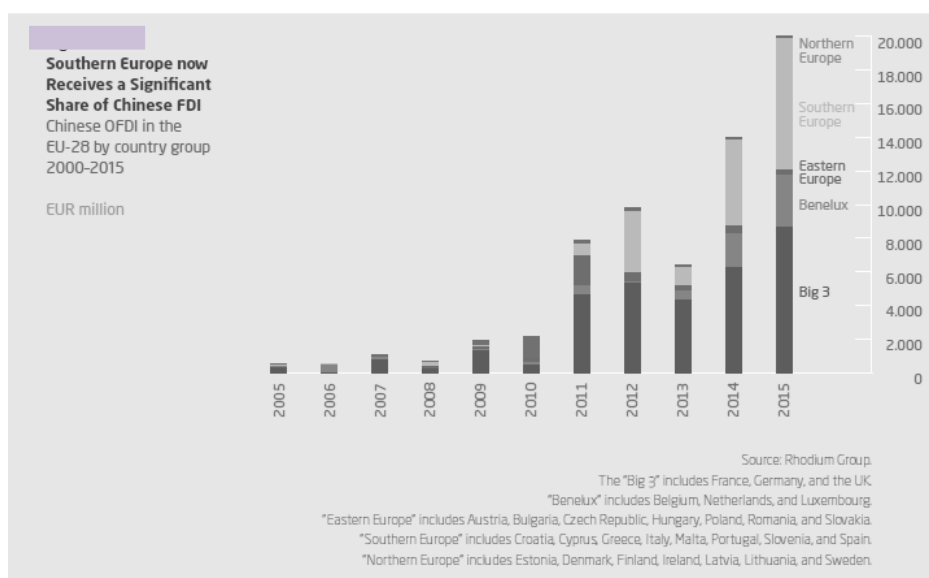


Source: Baker & McKenzie (Feb 2015)

Figure 2: Chinese Greenfield and M&A Transactions in the EU-28

Distribution of Chinese investment

In case of Chinese FDI in the EU, Europe's largest economy were also the largest recipients of Chinese investment. More than 50% of cumulative investments since 2000 to 2014 came mainly in the group Big 3 (Britain, Germany and France). A notable change came in investment in PIGS countries (Portugal, Italy, Greece, Spain). Total investment in these countries before 2011 amounted to less than 10%, whereas in the years 2012 to 2014 had risen to more than 30% when the Chinese corporation took the opportunity to buy companies at once state-controlled sectors, including transportation (Hanemann and Huotari, 2015). Due to performing the acquisition of the Italian Pirelli in 2015 it begins proportion of Chinese investment in southern Europe to catch up to the level of investment in the group Big 3 (Figure 3).



Source: Baker & Mackenzie (Feb 2015)

Figure 3: Souther Europe now Receives a Significant share of Chinese FDI

Chinese acquisition trends in Europe 2015/2016

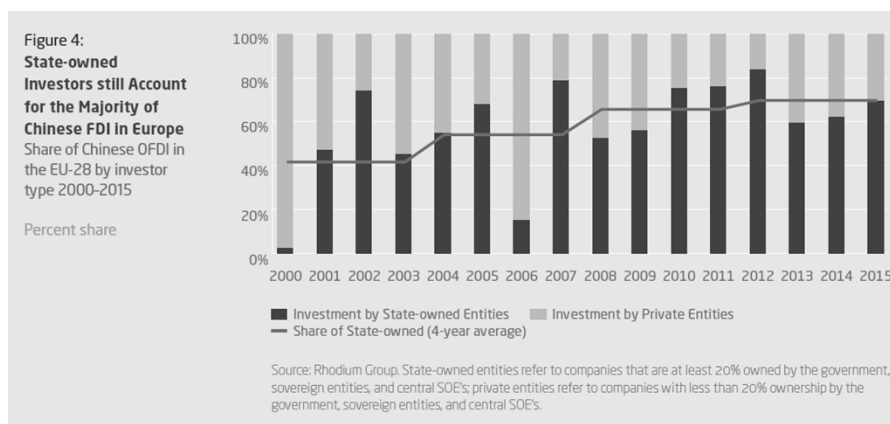
Chinese buying spree in Europe also continued in 2015. In England, Chinese investments dominated in the energy sector, specifically in the construction of the planned C block nuclear reactor at Hinkley Point. The transaction will reach up to 8 billion pounds for the 33.5 percent stake. In addition to investments in the energy sector, large acquisitions also took place in other sectors, mainly real estate such as an acquisition of the second largest European hotel empire Louvre Hotel Group, the deal valued at \$ 1.43 billion agreed with state-owned companies Shanghai Jin Jiang International Hotels (Chiu, Jan 2015). Furthermore, acquisitions also

occurred in the technology sector, for example the Dutch semiconductor company NXP, which sold its RF division specialised in manufacturing radio communication for \$ 1.8 billion. The buyer is a state-owned company Jianguang Asset Management Co (Higginbotham, May 2015). A dominant investor in this shopping spree is a Chinese state-owned company - Chinachem - so far the most famous deal was a purchase of Italian industrial icons - Pirelli. 143 year old Italian giant, the fifth largest tire manufacturer in the world was sold for 7.7 billion US dollars (Michelson, Mar 2015). After buying Pirelli, ChemChina's taste for even more investments. In January 2016 has announced acquisition of KraussMaffei, a German manufacturer of plastics, rubber, tracked vehicles for \$ 1 billion (BBC, Jan. 2016). However the shopping spree does not end here. The fact that the ChemChina still has sufficient money and taste for even more magnificent investments is demonstrated by an acquisition of Syngenta, the Swiss producer of plant protection products, for 44 billion USD. In fact, if the deal is successful, it will be China's largest overseas acquisition so far (Browning, Jan 2016).

Motivation behind the shopping spree

Although the decisive reason for exponentially growing Chinese FDI are loosening rules of capital controls in the Chinese economy as well as moderate supervision of the Chinese currency, it is necessary to examine reasons and intentions of Chinese investors more in detail.

At first glance it might seem that the majority of Chinese companies investing in Europe are state-owned enterprises (Figure 4) investing in assets whose prices were substantially reduced during the crisis. However, a closer look at closed deals will reveal a big picture.

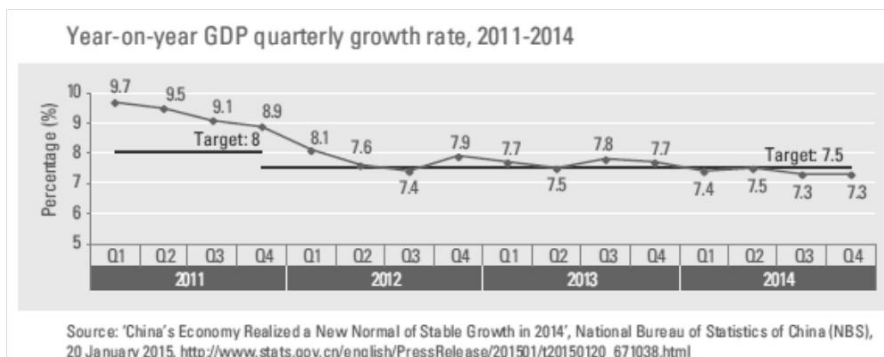


Source: Baker & Mackenzie (Feb 2015)

Figure 4: State-owned Investors still Account for the Majority of Chinese FDI in Europe

First, China no longer wants to be presented as a copycat nation (Thompson, May 2016). In recent years, with declining exports, China is trying to refocus on the domestic market. It is investing in technology while trying to acquire technology from abroad. Therefore, we can see that the bulk of Chinese investment in Europe is heading into technology companies.

Second, another factor in the increased interest of Chinese investors to invest in Europe can be caused by direct problems in the Chinese economy. China has for a long time struggling with declining productivity and turbulences in equity markets. Chinese economy has been declining gradually from 9.7% in 2011 to 7.3% in 2014 (Figure 5), and in 2015 Chinese GDP is expected to grow as low as 6.9% (Allen, Jan 2016). Given the current trends in the national economy of China and pressures to diversify the economy slowing and increasing appetite of Chinese investors to expand abroad while increasing their willingness to take higher risks. First, private companies are beginning to exploit newly gained freedom to invest abroad, which is the main motivation for direct investment in Europe and elsewhere in the world. On the other side, Chinese institutional investors, including sovereign wealth funds, insurance companies, private funds and financial conglomerates are also very active in foreign investment searching for opportunities to diversify the huge finances they are managing and which the vast majority of investments are currently in the form of domestic assets (Hanemann and Huotari, 2015). In addition, European stable business environment and its obligation to respect the right to property is also a good incentive for Chinese FDI.



Source: National Bureau of Statistics of China
Figure 5: Year-on-year GDP quarterly growth rate, 2011 - 2014

Thirdly, China has introduced a mega project so called "one route, one belt" which aims to reestablish and restore the Silk Road connecting China with Europe. The plan is not just a connection by land but also by sea (Map 1), which includes recently privatised Greek port – Piraeus (Costas, Dec 2015). The USD 1.5 billions deal backed by state owned company Cosco, will be a maritime gateway to Europe (Hope, Jan 2016). Besides investments in seaports, China is trying to invest in countries along the Silk Road through Asian infrastructure investment bank project.



Source: Reuters
Map 1: One route, one pelt

Fourth, China is the most populous nation in the world. With almost 1.4 billion people and the exponential population growth. Even faster growth is expected in following years after abandonment of one-child policy, therefore China is aware of the need assure supply and safety of food for population in the country. Hence to achieve this aim China has adjusted its strategy of abroad investments. A relevant example is the purchase of three million hectares of arable land in Ukraine, which represents for 5% of Ukraine (Jourdan, Sep 2013). Syngenta acquisition is therefore a logical step towards ensuring China's food supply and safety. By acquiring Syngenta, China as one of the largest consumers of fertilizer will gain technologies that significantly strengthens its agricultural production. The company is technologically advanced in seeds research and development of biotechnology.

Now we know why China wants to invest in the EU, but on the other hand, we should also explain why European states are willing to sell their assets. We must take into account that the inflow of Chinese capital in many cases means the supply of liquidity to the cash-troubled economies and therefore should not surprise us the willingness of some countries to sell their national treasures. Moreover companies themselves benefit from Chinese FDI generally associated with keeping jobs and provide fund for research and development. China is so unique and important because it is already a major global investor and it has the potential to become the single most important driver of global FDI growth over the next decade. Therefore, what should be put on notice is the simplicity and effectiveness of the strategies that Chinese investors apply in a process of acquisition of European companies.

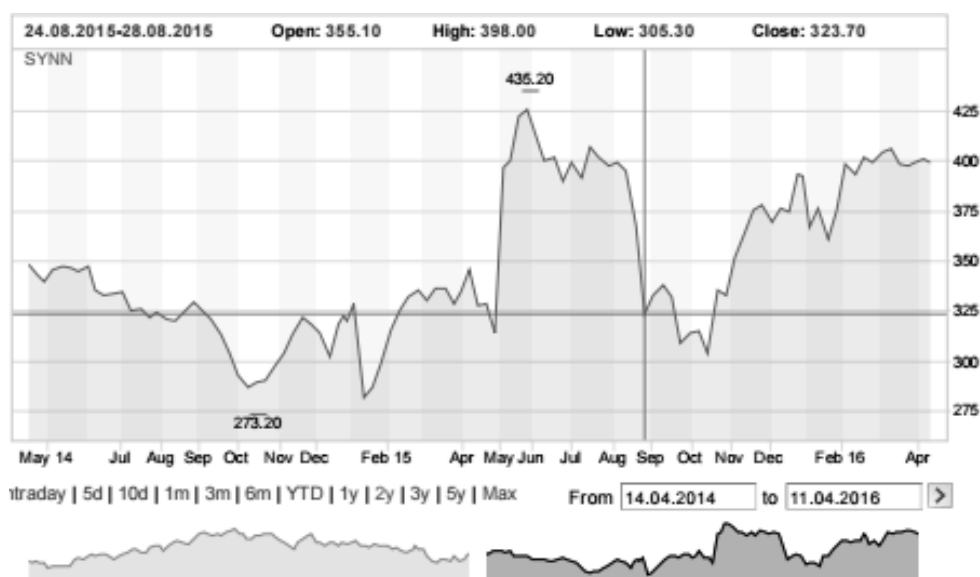
Hunt for European businesses

Even though the price of the assets of European companies are no longer as

attractive as it was during the financial crisis, the trend of Chinese investment suggests expansion of new investments.

With generous subsidies provided by state-owned banks, SOEs investing in Europe has an access to plenty of credit for acquisitions. Therefore, they can afford very simple but yet very effective strategy. If a target European company is not for sale at market prices, Chinese investors will increase their bid until the offer is too attractive to be rejected. Very good evidence can be seen at the acquisition of Swiss Syngenta.

As far as Syngenta is concerned (Figure 6), the company market capitalization before an acquisition announcement in October was as high as 30 billion USD. However Chinachem has offered 44 billion. USD, representing 147% of the market value of the company. This investment is also China's biggest overseas takeover in history so far (Donnan, Feb 2016).



Source: Bloomberg Market

Figure 6: Performance of the shares of Syngenta in the course of two years
Risks of Chinese investment

In times of financial downturn and stagnation, cash injections from China may seem like free money falling from sky. Nevertheless, these investments might represent a significant risk for Europe. Chinese enterprises investing in Europe are mostly state-owned or have very strong ties to the state. First, the purchase of government bonds, mainly from southern European countries, will directly affect debt policies in these countries (Wagner, Dec 2010). With increasing investments also increases the impact of Chinese companies on employment and social security in a host country.

In some cases, favoring Chinese economic injection of money over the political sobriety can lead to an indirect restriction of democratic principles and values recognized by the country. For instance, the Prime Minister of United Kingdom David Cameron refused to meet with the Tibetan leader Dalai Lama. The last meeting between the leaders in 2013 sparked an angry response from the Chinese government. China's foreign ministry said the meeting "seriously interfered with China's internal affairs" and "hurt" Chinese feelings. After a warning that Cameron's inappropriate actions may hurt China-UK economic relations, The British premier has not meet Dalai Lama officially ever since (Mctague, Sep 2015).

Chinese companies predominantly invest in mergers and acquisitions and only minimum of investments are involved in greenfield projects (Figure 2). Critics point out that in the short and medium term such investment will not create any new jobs. While the studies suggest positive impact of Chinese greenfield investment in a process of creating new jobs, in the case of mergers and acquisitions the impact on the economy is less clear. Nevertheless, merger and acquisition may be only way to save the company from bankruptcy and, therefore, saving jobs. On the other hand, if the post-acquisition stresses is misunderstood and poorly absorbed, it can lead to layoffs or even extracting valuable assets of newly acquired companies (Hanneman, Sep 2012).

The other risk includes unequal opportunities for investment. While Chinese investors have considerably more opportunities for investments in the European market due to more liberal rules, European investors on contrary have very limited opportunities for investment in China. Especially, in sectors where direct investment is prohibited by Chinese government, such as the energy sector. It is also necessary to take into account industries, where foreign investors is required to create strategic partnership with their Chinese counterparts in order to enter the market (MOFCOM, 2012).

Finally, Chinese diplomats increasingly use the promise of investment and other financial flows as a diplomatic instrument to seek politically favourable outcomes in negotiations with the EU and its member states. The promise of investment is used the leverage on political decisions not only in a EU but also can influence decision making process in the euro area on critical issues. For example, the decision of the International Monetary Fund to include yuan, the Chinese currency, to its reserve the currency basket in November 2015, despite of arguments that the yuan has not yet fully meet the criteria (IMF, 2015). Recently, competition between European countries on Chinese investment creates room for further deepening of relations with China and, hence, exposure to a greater Chinese influence. This raises a dilemma how much should host economies be succumbing to China's influence and its interests. Since each country in the EU is aware of a fact that if they refuse the money, the other EU countries are happy to accept Chinese investments. This race for Chinese investment is also contributing to a division between European economies over important economic policy decisions. As a consequence, opinions among EU countries on important economic issues are

fragmented whether or not to grant China market economy status.

Czechia case

Very distinctive case of the contrast between economic interests and democratic principles was a two-day of state visit of Chinese President in the Czech Republic on 29.03.2016. Due to the sensitive issue of China and human rights, the visit by President Xi Jinping have drawn protests from the Czech opposition. On the one hand, Czech police was under strong criticism on the practices during a crackdown on human rights activists. Numerous clashes occurred between human rights activists with Tibetan flags and pro-China supporters. According to the media, police intervened against activists more than the Chinese. One noticeable evidence of violation of the freedom of expression was the case of Tibetan flag placed on the Prague Film Academy (FAME) building by students with a dean's permission. University personnel were questioned by policemen. Czech police later admitted the error and apologized (Polak, Apr 2016). On the other hand, there is no doubt about the economic benefit that Zeman was able to attract. More than 30 deals were closed during the visit. Over 5 years period more than 232 billion Czech crowns will be invested in Czechia (Štůsek, Apr 2016).

Conclusion

To summarize, we can see that the influence of China in the Eurozone and European Union significant. In one aspect it means a positive influence. First of all, we emphasize the rescue of heavily indebted eurozone countries by providing much needed liquidity into economy. Second, to save and preserve jobs in companies in the form of mergers and acquisitions. Thirdly, to promote growth of the Eurozone economy through various projects such as the new Silk Road project with the support of the newly formed Asian Infrastructure Investment Bank.

From a negative point of view, given the size and interconnectedness of the Chinese economy with the global economy and thus growth of the most populous country, the downturn, the losses are immediately reflected in the performance of the world economy. In addition, the decline in growth of the Chinese economy also leads to changes accompanying effects such as lower fuel consumption, which sharply depresses oil prices and this has an impact on the economies of which are oil producers. Considerable may also be an influence of the Chinese government through the state-owned companies investment in Europe. Furthermore, we see the potential negative impact on political decisions or indirect suppression of Western moral principles in exchange for economic cooperation and Chinese investment.

It will also be important to examine how European leaders adapt political priorities in anticipation of a massive influx of cheap Chinese money. Whether Europe keeps open policy towards Chinese investment because their advantage in terms of potential opportunities to increase productivity and employment or the EU will try to take measures against the Chinese expansion, thus limiting its possible negative

impact on EU decision-making at the political level.

Taking into account our findings, we assume that inflow of Chinese investment will continue to increase. With the inflow of financial aids, China's influence EU countries will also increase. Obviously the Eurozone crisis is not yet over and with deepening migration crisis, EU countries will need even more liquidity in their economies, while China still has sufficient free capital.

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Managing Education, Training and Knowledge

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Abstract

Purpose of the article: Knowledge is increasingly importance for the economic well-being of businesses. Core competencies of management are the generation and processing of information, used to develop a competitive advantage. Information has become established as a commodity in its own right which can be bought and sold. Four out of five goods traded on the market now consist of services or relate to information in the broadest sense. Knowledge is created when different pieces of information are linked on the basis of a particular intellectual background and meaningfully interpreted. Accordingly, knowledge incorporates not just information but also experience, (pre)-judgements, rules of thumb and worldviews. Knowledge is always associated with human beings. Methodology/methods: This article is based on literature research. The original article was written in German and translated into English, supported by a translation agency. Scientific aim: A questionnaire is being drawn up on the basis of the research results. This will allow the appraisal of these influencing factors and framework conditions by small and medium sized enterprises to be surveyed and evaluated. Findings: Social systems arise through and are sustained by communication. Actions of managers primarily consist of communication. For cognitive simplification, all humans repeat actions that have previously proved successful. Previously accumulated knowledge thus becomes a significant barrier to learning. An organisation's ability to learn depends not only the general willingness of its workforce to learn but also on the newness and/or compatibility of knowledge acquired from a partner. Conclusions (limits, implications etc): Developing or acquiring competition-relevant knowledge is generally time-consuming and costly. As a complementary function to knowledge acquisition, the retention of knowledge carriers in the form of people and materials forms another component of knowledge management. It is important to recognise early on those knowledge carriers who promise high potential in the future.

Keywords: *Knowledge, information, experience, judgements, management, organisation.*

JEL Classification: *M12, Personnel Management, Executive, Executive Compensation*

Introduction

Technical advancements have always represented an advancement in the process of adapting the world in accordance with a human measure. People who can change realities, generally change the framework of life for themselves and others.

Manufacturing has the capacity to change human existence and render usable what is available. As a particular ability, a human skill, to change the nature of things, manufacturing can be taught and learned. As the variety, quantity and quality of products increases and the amount of work involved in the manufacturing process decreases (the result of rising productivity), it becomes possible to increase and advance the skill of manufacturing.

The division of labour is successful, because human beings have two abilities to increase the efficiency of manufacturing, namely the ability to organise coordinated action and the ability to understand the nature of things. Organised manufacturing is a defined pattern of cooperation and a variable interaction which can be continually redesigned and improved. The basic pattern is the coordination of similar activities as a simple addition of efforts or a combined effort, a pooling of efforts or a sequence of activities. One level higher this is the coordination of dissimilar activities, starting with a simple juxtaposition of complementary activities, the emergence of division of labour at societal level. This is what made the differentiation of various functions and the beginning of specialisation possible. The next step is the coordination of dissimilar activities in a cohesive work process, or process-related division of labour. This is made possible by the fact that our movement processes can be divided into smaller parts that are independently available and can be combined into skilled movements (LORENZ, 1973).

Modern science combines the mathematically formulated laws of nature with the strategies of manufacturing. Only by science the potential for increasing efficiency is fully realised.

1 Knowledge, Education and Training

In the industrial sector, the transition to a knowledge society is an evolutionary process (STEHR, 1994). In other words, the intellectual component of traditional activities are changing (SOUKOP, 2001); (TOFFLER, 1991). In production operations, manual and mental work are merging together as the boundaries between tangible and intangible assets become blurred. Ultimately, the cognitive and creative skills of employees will be decisive to the economic well-being of businesses and national economies. The form of labour of relevance to developed societies is knowledge work (WILLKE, 2001) and the relevant type of worker is the knowledge worker.

In highly industrialised countries, simple work is increasingly being performed by machines or relocated to countries with lower wages and social standards. The manual work that remains in high-wage countries is being optimised by a growing knowledge base and therefore raised to a higher level. Work in the knowledge economy places more emphasis on the power of the expert than on hierarchy, and the lifelong, mostly linear career is fragmenting into a variety of career patterns (SATTELBERGER, 1999). At the same time, workers are being required to demonstrate more self-organisation skills.

In a knowledge society, people must organise their own jobs (MALIK, 2001). Knowledge workers are people who operate with a high degree of autonomy due to their expert status and are also extremely mobile. They identify more strongly with their area of knowledge than with their employer and only engage in a formal employment relationship on a temporary basis. This type of worker will grow in number and in importance. It is likely that they will bring about the old socialist utopia in which the essential means of production are in the hands of the workers (TOFFLER, 1991a).

Knowledge, information, expertise, intelligence, experience and so on are subject to an accelerated ageing process, and constant innovation is becoming a core element of successful economic activity. While knowledgeable people used to spend a lifetime acquiring their knowledge, retained it and either took it with them to the grave or chose to share it with a few select pupils, on average the knowledge embodied in today's experts has a half-life of just a few years. It confers the greatest benefit when it is shared as widely as possible.

When you stop learning, you fall behind. However, lifelong learning also means unlearning and relearning throughout life. One psychological effect, which should not be underestimated is, that the world of knowledge will no longer offer enduring certainties or established intellectual states.

The realisation of intellectual capital will of course continue to require a certain amount of capital in kind and financial capital. Capital will effectively support the process of translating knowledge into achievement and success, and

help businesses and economies to perform their respective tasks rather than dominating them (DRUCKER, 1993). In knowledge-intensive services, software or media companies, the core factors of production are invisible. The company's main success factors are ideas, creativity, image, employees' problem-solving skills, the speed of R&D processes and the capacity for continual learning (PAWLOWSKY, 1998).

It follows, that intensive efforts must be made in education and training at both school and occupational level. From a global perspective, the growing demand for well-trained knowledge workers also raises the problem of underpopulation in developed countries (DRUCKER, 1998).

2 Education and Training in the Social Context

The greatest and only capital on which we can build confidently in the long term is the individuality of our human capital. When a problem arises, which the system has not previously encountered, a solution only can be found, if the system exhibits a very high degree of variation, diversity and individuality. The incredible potential of individuality and the hopelessness of averageness are both the driving force and the result of evolution. Individuals are unique, because they are genetically unique and they are the product of a unique set of past and present environmental factors.

2.1 Prerequisites of achievement

Talent is certainly a prerequisite for achievement, one which is at least partly determined by genetics, but it defies measurement. It is only success which can be observed, verified and measured. Lifelong learning is the only way to discover otherwise hidden talents and translate them into exceptional achievement. New ideas only come about, when old ideas are shaken up and recombined. Always learning the same thing and thinking in traditional ways will not achieve advancement, either for the individual or in terms of the future prosperity of a society (REICHOLF, 2006).

Maximising diversity and promoting individuality increases the odds that some people will produce solutions to the challenges of tomorrow. Evolution, probably the most important basic principle of biology, serves as evidence of the importance of individuality as an opportunity to prepare for an unknown future. Migration increases individuality in a given system and is therefore an essential component of evolution. This naturally includes the essential importance of cultural, social and other aspects.

No one wants to be the one, who deviates from the norm or wants such a person as a child, pupil, student or employee. These people create problems. At the moment they aren't necessarily good for business, because they ask too many questions. It is a fact, that people who break new ground, are more conspicuous

than ever before. Drawing attention to yourself by being different, is always associated with fear. But if we all strive for the highest possible degree of individuality, we will not fear the consequences of differing from the norm because being different will become the norm. If we are to overcome major challenges, then being different must be the rule, not the exception. Nothing is more difficult than being the only person around the table to hold a particular opinion while everyone else favours another one. The laughter, the arrogance of the majority, which is so often wrong, must be countered with wise courage (GANSTERER, 2013).

2.2 Individuality

The aim of evolution is to allow individuality to occur. We as a society should do the same thing. Obviously, maintaining a high level of individuality is costly, but it may prove much more costly to succumb to the lure of short-term success or the elation of instant profit and thus jeopardise our whole future.

The person who is different, who has been differently trained, does not have the blinkers of insiders, or the fear of the initiated to expose themselves to ridicule by asking naive-sounding, but often brilliant questions. Experience shows, that people who are relatively new to an area are generally willing to try something new. The value of any team, network or interaction that we form is greater the more individual ideas, prerequisites of achievement and experiences are represented in it. These prerequisites of achievement must be discovered through hard work (= practice) and translated into exceptional achievement (= success).

Although practice is extremely important. This does not mean that everyone who does the same amount of practice will achieve the same thing. Success is the exceptional achievement that can result from practice through hard work. Outstanding human achievements in the sense of success are impossible without years of learning and practising (ERICSSON, 2007). As we get older, our epigenetic code changes. Humans may share the same genetic makeup, but the epigenetically controlled use of genes varies. It varies the more the older people are and the more diverse their lives have been. The decisive factor is the constant interaction between biology and environment.

Psychological demands have an important influence on the epigenetically controlled use of our genes. Negative stress can also cause the incorrect epigenetic use of the genetic receptor. The intrinsic interest in transforming talent into success must be encouraged in a psychologically positive environment with satisfying characteristics such as enjoyment in the implementation of a task, the stimulation of curiosity and freedom from pain. Otherwise, practice will only do harm and may suppress more biological prerequisites of achievement than it gives rise to.

2.3 Intelligence

The epigenetic code can be influenced throughout life by environmental factors and lifestyle. At least some of the chemical modification of the DNA can be inherited by the next generation. In some cases it is possible to speak of the inheritance of acquired traits. So far there is little evidence of this.

The theory of multiple intelligences does not, in theory, exclude the possibility of having all intelligences or indeed none of them to any marked extent (GARDNER, 1983). People with linguistic intelligence (writers, journalists, actors, lawyers, politicians etc.) are able to learn languages easily, have a high sensitivity to spoken and written language and the ability to use language for specific purposes. Musical intelligence (musicians, conductors, composers etc.) and logical-mathematical intelligence (scientists, mathematicians etc.) are self-explanatory. Visual-spatial intelligence (visual artists, architects, chess players etc.) enables people to understand spaces, whether on a large or a small scale. Bodily-kinaesthetic intelligence (athletes, dancers, manual workers etc.) describes the ability to use the body for problem-solving or to make things. Intrapersonal intelligence is important in all occupations or activities (GARDNER, 1983). It helps us to make decisions and enables us to understand ourselves, for example to understand our own emotions, weaknesses, strengths and motives. Interpersonal intelligence (politicians, parents, psychiatrists, teachers etc.) includes the ability to understand the capabilities, moods, feelings or others and is an important prerequisite for successful interactions with other people.

The last two intelligences named above laid the foundations for the theory of emotional intelligence (MAYER, 1990), which refers to the ability to perceive and understand one's own feelings and the feelings of others. Emotional intelligence is closely associated with social skills, sometimes referred as soft skills. In-depth psychological research projects are currently being carried out to establish the scientific verifiability of such abilities.

Empathy is generally understood to mean the ability to recognise and understand the thoughts, emotions and intentions of others and sometimes a person's reactions to other people's feelings. Abilities may be categorised (REIMANN-HÖHN, 2007) as linguistic, logical-mathematical, visual-spatial, practical-naturalistic, artistic-creative, athletic and social-emotional, taking into account the influence of environment in all its aspects.

The idea, that genetically unique prerequisites of achievement must be discovered through hard work and translated into exceptional achievement (= success), requires some explanation. Motivation is an extremely important topic. In artistic achievements, the necessity of both, intrapersonal intelligence (the understanding of one's own feelings, weaknesses and strengths) and interpersonal intelligence (the ability to understand the moods and feelings of others), is clear.

Studies also show that musicality, hearing, voice and language belong under the same biological umbrella (THEUSCH, 2011). Success requires the combination of many achievements and achievement requires the combination of many prerequisites of achievement. The ability to create something new remains stable and consistent throughout the life of an individual. "You cannot turn a non-creative person into a creative person. However, it is possible to create an environment, in which people find it easier to display their creativity (WEISS, 2011)." Creativity is a facility that many people have, but too few fully exploit their creative potential. The reason is an environment that does not encourage or demand creativity. "Every child is an artist. The problem is how to remain an artist once we grow up [attributed to Pablo Picasso]."

2.4 Science

To attain outstanding achievements, creativity in all areas is essential. It must produce something new, create unique solutions. The aim is to locate the limits, not in order to be constrained by them, but in order to go beyond them. Scientific success begins where it creates something new.

We value individuality in all areas of life, in science, art, sport and in our social relationships. But when it comes to selecting, educating and training pre-schoolers, school pupils, students and workers, too often we focus on the valueless average and refuse to step out of line because of fear, leaving our comfort zone, losing a feeling of security, the desire to be in the majority and so on.

In the basic sciences, the practical significance of new knowledge may not become clear until many years later. The fact, that the work of scientists and researchers often lacks public visibility, means that self-motivation is absolutely essential. Scientists also need linguistic ability, while teamwork and interpersonal intelligence are needed in international research teams. As a result, scientists are increasingly becoming managers.

Pure subject knowledge is becoming less important as the need for presentation skills and interpersonal skills increases. Managers need to know what they are capable of and what they are not capable of. They need a sense of their own limitations and a good understanding of their mistakes and faults in order to handle them appropriately. Mental illness is very often simply the result of a lack of self-understanding and self-reflection.

2.5 Temperament

A highly individual facility, which is extremely relevant to a person's achievement potential, is temperament. This strongly influences how and in what circumstances a person is able to achieve something which can be described as a success. A person's temperament, which is largely the result of genetics, is part of that individual's personality and describes how this person act and react, in other

words their style of behaviour.

Nine temperament characteristics are often described: activity, regularity or predictability, initial reaction to new stimuli, adaptability, sensitivity, mood, intensity, distractibility and persistence (RESCH, 2001). The willingness to accept extrinsic motivation in the form of pay and intrinsic motivation, the willingness and ability to work hard and with focus, depend primarily on individual temperament.

2.6 Talent

Lifelong learning is the search for talent. In order to find talent, the range of opportunities on offer must be open, broad and accessible with a low threshold and people must be encouraged to use it. The more things individuals try out, the more curious they are the greater the chances of discovering their natural abilities for their personal benefit and that of society are.

Identifying, highlighting, stigmatising, combating, avoiding and dealing with mistakes has become a profession in its own right. It must be clear, that no innovation has yet resulted from this. It is simply the management of what already exists. Obviously, certain basic standards must be achieved. Searching for exceptional achievements, new ideas from employees, activities that produce outstanding success must take centre stage. Parents, teachers, politicians and trainees must all have the goal of enabling young people to attain their personal best. The higher the level of education that parents have, the more value they attach to individuality and the less on norms of attainment and adaptation. And education is the key to individuality.

The successful completion of a task, the solving of a problem is, per se, the greatest possible reward. And the route there is intrinsic motivation. The aim is fulfilment, perfection and self-determination. In creative thinking, the solution to a problem is approached associatively, with emotions and novel ideas. Success often only becomes apparent when creative ideas are linked to organisational talent.

3 Managing Knowledge

Eighty per cent of all the scientists and engineers, who have ever lived, are alive today. The process of value creation in organisations and nations has always been based on the - preferably exclusive - possession of knowledge and its skilled application. Any management task is inseparably linked with the generation and processing of information. Knowledge management is a core area of management, because managers are information-processing decision-makers.

Knowledge management in organisations is mainly of interest in its strategic dimension. How the systematic maintenance of the corporate knowledge base can be used to develop a competitive advantage. In this respect, learning

organisations are more in the spotlight than knowledge organisations.

3.1 From an industrial to a knowledge society

The thesis of the post-industrial or post-capitalist society (DRUCKER, 1993a) is based on far-reaching changes in the economy and society and can be seen on three main levels (WILLKE, 2001a) (SOUKOP, 2001a): the knowledge society in general, intelligent organisations, their intelligent assets, and occupational activity in this society (knowledge work).

The second level can be seen, for example, in the greater influence of information- and knowledge-based institutions on economic value creation and the growing number of knowledge-based products and services.

Information has become established as a commodity in its own right, which can be bought and sold (TEECE, 1998). The thesis of the transition to a knowledge society is based on the undeniable loss of importance of the historically older factors of production of land, labour and capital. A hundred years ago, for example, the factor of land still played a crucial role in the affluence of society. During the period of industrialisation that followed, the emphasis shifted to labour and capital, which in turn were superseded by knowledge. Four out of five goods traded on the market now consist of services or relate to information in the broadest sense (WILLKE, 2001b). Knowledge workers represent more than a third of the workforce (DRUCKER, 1993b). For knowledge workers, information is a raw material, tool and result. They process data and information and convert it into value-adding knowledge (SOUKOP, 2001b).

3.2 Resource-based view

In industrial economics, the outside-in perspective proposes that a successful business must act first and foremost in response to the market, for example it must understand and satisfy the needs of customers better than its competitors. The management must first identify profitable industries or segments and then position the business within them in such a way as to maximise its prospects (PORTER, 1995). The resource-based view, on the other hand, places the main emphasis on the organisation's own resources and capabilities. According to this inside-out perspective, the successful business is one that has developed important capabilities at the right time and/or has resources which are superior to those of the competition.

Certain resources cannot be freely traded and must be developed in internal innovation and learning processes (DIERICKX, 1989). In the long term, only non-tradable resources can serve as the foundation for a competitive advantage (TEECE, 1998a). These two perspectives are complementary, two sides of the same coin (KNYPHAUSEN-AUFSESS, 1993). A resource-oriented strategy needs

an in-depth market evaluation and a market-oriented strategy needs a careful consideration of available resources (ZAHN, 2000).

Ultimately, a business must have its own bundle of capabilities in order to achieve a degree of distinctiveness based on intangible assets. These intangible assets cannot be bought on procurement markets and must be developed in house over a long period of time. This also includes the company's intellectual capital, the knowledge possessed by employees or situated in particular organisational processes. The resource-based approach therefore offers a theoretically cogent explanation of the link between a company's resources, competencies and competitive advantage (PETERAF, 1993) (COLLIS, 1998).

3.3 Competency

A business only has an advantage over the competition, if it has the ability to develop and bundle particular capabilities from its own resources and deploy them effectively in the value creation process (AMIT, 1993). Competency refers to proven operational capabilities put to a work-related purpose (KRÜGER, 1997). Competencies, as a match between capability and requirement, are the proven abilities of a person, department or entire company to reliably fulfil a particular task (KROGH, 1995). When resources and capabilities are used to develop a particular capacity, then a company has a core competency. This complex bundle of self-contained facilities consists of more than a single capability or a specific technology. A core competency constitutes what has been learned across individual capability areas and organisational units (HAMEL, 1997).

3.4 Inimitability

A special capability should result in a preferably unique product or service which enables a business to stand out from its competitors. Core competencies only provide differentiation where it is difficult for competitors to imitate them. The causes of the inimitability of competencies relate to the dimensions of time, costs, persons and complexity. Cross-functional capabilities, in particular, can only be acquired through time-consuming, cumulative learning processes (DIERICKX, 1989a). Capabilities based on human expertise are difficult to imitate because learning through experience is an individual process. In addition, often special individual knowledge is involved, which is hard to verbalise (BARNEY, 1991).

The more resources depend on one another for their effect and the more closely they are interwoven, the harder it is to imitate the resulting competency, giving rise to instrumental ambiguities (DIERICKX, 1989b). Indeed, if knowledge about the effects of individual measures were not so diffuse, it might be lost very quickly through observation of the competition or the enticement of competent knowledge bearers.

3.5 Non-substitutability

The amount of information that needs to be managed by individual companies, its inconsistency and its susceptibility to degradation is increasing all the time. Tangible assets are being displaced by intangible, often digital assets. It can be seen, that modern economies are removing the boundaries between tangible and intangible assets (WEBBER, 1993). The product of the future has a core of intelligence and a shell of service (DECKSTEIN, 2000). The intellectual capital of businesses, too, is increasingly extending to the internal domain. Regardless of the end product market in which a company operates, more and more technical and organisational know-how is being incorporated in business processes. Not only products but processes, process improvements and production are becoming more intelligent (HEISIG, 2001).

Before Frederick TAYLOR (1917), the only way to increase production was to work longer and harder. For the first time in the history of labour, TAYLOR drew attention to the importance of a trained person (DRUCKER, 1972). The systematic rationalisation of human labour has significantly increased the productivity of the economy as a whole. At the same time, the social problem of increasing the income of unskilled workers to an adequate level was solved while reducing working hours and physical effort. The consistent application of TAYLOR's analytical knowledge made day labourers attractive to industry, their productivity growing by around a hundredfold (DRUCKER, 1972a).

In the case of contractually, spatially and organisationally integrated value creation partners (just-in-time), the exact flow of information replaces the tangible inventory and ultimately results in an entirely new form of working. Knowledge-based competitive advantages can arise, when a company possesses more or more valuable knowledge, propagates knowledge more efficiently (for example faster or more cheaply) or uses knowledge more effectively.

3.6 Characters, data, information

The character may be defined as the smallest element of data which can be accessed in program execution (REHÄUSER, 1996). Characters are an infinite selection of letters, numbers and special characters, which do not have an inherent value and only create sense through the way they are combined.

Characters are transformed into data by means of rules or syntactic specifications. Data contains no evaluation and cannot serve as a basis for action (DAVENPORT, 1999). It only becomes meaningful when placed in a meaning context.

Data becomes information when it is evaluated using selected relevance criteria (WILLKE, 2001c). Because information forms the basis of decisions affecting individual economic players and the economy as a whole, it may also be

described as the single most important economic resource (PICOT, 1988). Information is blocks of knowledge which can be conveyed either verbally or non-verbally. The counterpart to information is knowledge, which cannot be transmitted in trans-subjective form (BODE, 1997).

3.7 The use of knowledge

Knowledge is created, when different pieces of information are linked on the basis of a particular intellectual background and meaningfully interpreted. This is only possible, when it is integrated in a subjective world of thinking and living. In this way, information is placed in a person-related usage context, a subjective pragmatic. Accordingly, knowledge incorporates not just information but also experience, judgements (including prejudices), rules of thumb and worldviews. These elements form the basis, on which data becomes information and information becomes knowledge. Knowledge is always a conglomerate of the internal and the external (DAVENPORT, 1999a).

In contrast to information, knowledge needs to be stored. If it is forgotten, it cannot become knowledge. Knowledge must be applicable, because knowledge refers to the totality of known facts and capabilities that individuals use to solve problems. This encompasses both, theoretical knowledge and practical everyday rules and instructions. Knowledge, based on data and information, is always associated with human beings (PROBST, 1999).

An exchange of information requires the participating systems to possess absolutely identical relevance criteria, which is not even the case with identical twins (WILLKE, 2001d). A smooth, continuous transition between information and knowledge formation is therefore required (PROBST, 1999a). It should also be noted that just as information is a prerequisite for knowledge, knowledge is also a prerequisite for information.

The resource-based approach calls for individual and collective knowledge to be transformed into (core) competencies, which in turn are deployed in the form of routines and strategies to increase competitiveness. The personal integration and embedding of information, preceded by that of characters and data, is essential to successful knowledge-building. The purpose of information management is to ensure the best possible use of resource information with respect to the corporate objective (KRCMAR, 2000) and to ensure that information is present in the right quantity and quality at the right time and in the right place. In the technical domain, the main tools available for this purpose include written documents, archives, and information and communication technologies. The aim of knowledge management is to effectively use and develop knowledge and capabilities considered necessary to the purpose of the organisation. It embodies an integrated intervention concept, concerned with the possibilities of shaping the organisational knowledge base (PROBST, 1999b) and focuses on practical effects.

4 Communication

Empirical studies show, that the actions of managers primarily consist of communication (SCHREYÖGG, 1992), examined in two main flows (STAEHLE, 1999).

Mathematical-technical information theory is concerned with the transmission of messages within technical systems. The main focus is on various sender/receiver models (VÖLZ, 1991). One basic concept is one-way communication, where messages are sent in one direction only and no response is possible, because of the nature of the system.

There is also two-way communication, in which messages are exchanged in both directions and a certain amount of feedback is permitted (OENICKE, 1996). Dialogue is immensely important in the day-to-day interaction of managers and employees. For example, 70% of learning at work is face-to-face, namely in mentoring programmes, training sessions (Training-on-the-job) and similar personal forms of knowledge transmission (HORIBE, 1999).

By extending technical information theory to include bidirectional communication, it can be linked in to behavioural communication theory. Here, the focus is on the examination of interpersonal social interaction. Not only data and information is relevant, but also statistically less measurable factors such as emotions, moods, values, attitudes, leadership styles and social skills. Social systems arise through and are sustained by communication. The communicative process determines the integration of the individual into the level of social subsystems (PAWLOWSKY, 1992) and is essential to the existence and stability of a social system. For this reason, organisation and communication are sometimes treated as the same thing: Communication is organizing, Organizing is the organization (JOHNSON, 1977). Behavioural communication theory is more suitable for analysing person-induced communication problems which are more relevant in everyday business life.

Social psychology acknowledges, that communication consists of a relational level as well as a content level. The relational level is the relationship between interacting individuals and it establishes a social relationship as a precondition and framework for communication. The less problematic social relations are, the more easily factual information can be exchanged (PICOT, 2001).

Communication problems tend to arise, when the sender and recipient do not use the same interpretation key. All individuals live in their own world. One person's reality is not an exact reflection of the real world, rather a subjective impression of it, a construct. Truth is not found, but fabricated. The core thesis, which can be transferred to businesses, is that there is no true reality beyond the subjective interpretations of the members of an organisation. The contextual framework in which employees operate is individually interpreted. Accordingly,

organisations are also constructs (WEICK, 1998).

Symbols play an indispensable role in the process of the subjective construction of reality. Symbols abbreviate, simplify and standardise organisational communication and therefore form the corporate culture (NEUBERGER, 1994). Communication provides the foundation for shared knowledge acquisition and therefore represents the crucial link between individual and collective organisational learning. In this way, communication, language and symbols form central aspects of organisational learning (ECK, 1997).

Communication is a vital element in the formation of organised systems. People, as the agents of communication, are self-contained units which relate first and foremost to themselves (LUHMANN, 1994). The processed information is ultimately produced by people themselves through communication. In this sense, communication processes within a company extend far beyond the purely practical, informative level.

5 Learning in Organisations

Learning is the key process of access to knowledge management. If people do not learn, then there is nothing to preserve, distribute or utilise. Humans have the ability to reason and for example can learn by thinking or observing a model (Imitation). From being mainly limited to psychology, the concept of learning has therefore grown to become a broad sub-discipline in its own right (SHRISVASTAVA, 1983). Behaviouristic learning theory has been complemented by personality-based, social and cognitive theories (PAUTZKE, 1989) (GÜLDENBERG, 2001).

Learning is primarily based on experience. The members of an organisation make work-related decisions and then draw conclusions from the reaction provoked in the environment. Then they use these conclusions to develop more effective future actions (CYERT, 1963) (HEDBERG, 1981). At the forefront of this approach is adaptation to a changing environment.

In terms of the knowledge construct, learning is understood to mean any accidental or deliberate change of the organisational knowledge base. This includes both, the acquisition of new knowledge and bodily-motor improvement. Learning also takes place, when existing assumptions or insights are reinforced, modified or abandoned as irrelevant (SANCHEZ, 1997). Through learning, the organisational knowledge base is enlarged and qualitatively developed. In the context of the organisation, people reflect on the results of their actions through changed rules, strategies and problem definitions (SCHREYÖGG, 1998).

In the research there is a consensus, that learning requires a certain degree of redundancy (NONAKA, 1997). Operational redundancies may also be interpreted as surplus resources (CYERT, 1963a), which denote a positive

difference between required and available organisational resources. A company owns more resources than are necessary to the direct fulfilment of its purpose. The value of these surpluses to a company's ability to develop is increasingly being recognised. Achieving a higher level of performance therefore requires learning resources to be kept free in order to have time to experiment with new solutions (KLIMECKI, 1991).

5.1 Unlearning

The purpose of all structural stipulations is to exploit routine effects, for example to avoid a continual search for new solutions. Every organisation attempts at least to some extent to protect applicable rules from changes and therefore against learning progress (OELSNITZ, 2000). This demonstrates the need to unlearn obsolete knowledge (SIMON, 1989) (HEDBERG, 1981a). This is true for both, the organisation and the people who operate within it. Unlearning is a conscious and deliberate act, which begins as soon as new knowledge replaces or is superimposed on old knowledge (GÜLDENBERG, 2001a). On the other hand, forgetting is unconscious, protecting the individual against overload and stress (VESTER, 1993).

Unlearning is important in an organisational context, because it prevents wrong decisions from being made due to obsolete knowledge. The more successful the results achieved using past rules and procedures, the more difficult it is to disregard previously acquired knowledge. The organisational capacity to learn is the only permanent competitive advantage (STATA, 1989). The most important learning goals of a company are greater proximity to the customer, greater innovation, more efficient processes, simplified management, employee self-motivation and greater organisational ability to transform.

5.2 Persistence

For cognitive simplification, all humans repeat actions that have previously proved successful. Previously accumulated knowledge thus becomes a significant barrier to learning. Other tendencies associated with the concentration on existing knowledge are new abilities being discovered to the detriment of existing competencies, advantages won being risked in favour of an insecure investment, a difficulty in specifying future competency requirements, and a situation where, although the exploitation of available knowledge only benefits the company, the fruits of an innovation can be harvested by skilful imitators, while the innovator has to take steps to prevent knowledge draining away.

5.3 Levels of organisational knowledge

Learning presupposes a subject with a clearly delineated identity and can only be performed by an individual (EBERL, 1996). Although organisations

possess a collective memory, they do not have an apparatus with which to autonomously create new knowledge (HEDBERG, 1981b) (SIMON, 1991), nor do they have a central reservoir that stores all the knowledge available to it.

Within organisations developed collective views and business understandings impact on every employee. Within social entities a sense of community (Common sense) is formed, which gives individuals a framework for action and continues to exist regardless of the membership of the individual (ETZIONI, 1975). Organisations depend on the people, which constitute them, but not on specific individuals (LUNDBERG, 1995).

A combination of political calculations and structural shortcomings means, that the total knowledge of all members is never identical to the available organisational knowledge. Learning within and by organisations results from the interconnection of individual and institutional knowledge to produce subjectively new organisational knowledge, from which added value is created. In an operational context, therefore there are three different levels of learning (REBER, 1992): the individual level (person), the micro-social level (group; collective learning) and the macro-social level (complete system; collective learning).

The group level provides an essential platform for collective learning and also serves as the link between the individual and macro-social levels (PAWLOWSKY, 1992a) (REBER, 1992a). Only when teams are able to learn, the organisation is able to learn (SENGE, 1999). In particular, the group has the job of transferring the fruits of personal learning processes into the social system (the transfer function) and generating learning and performance advantages at group level compared with the individual (the generation function).

5.4 Processes and barriers in organisational learning

Individual learning results in an increase of private knowledge. Organisational learning, on the other hand, represents an increase of public knowledge. In order to achieve the transformation from individual to collective knowledge, there must be a process of exchange between the different levels of learning. Three criteria are crucial to the knowledge of the individual employee (DUNCAN, 1979). Knowledge must be:

Communicable. To perform their roles, members of an organisation need a range of information which they do not possess themselves. They must also make their own learning results available to the collective. The information thus transferred must therefore be communicable, for example it must be possible to share it as explicit knowledge.

Consensus-forming. Messages and content must have particular characteristics in order to be intersubjectively transferable and acceptable. This includes a collective consensus as to validity and usefulness.

Integrable. Most members of a company increase their knowledge through their work or specialisation. This knowledge is only usefully transferable, if other departments or functions can understand and integrate it into their mental models.

Knowledge takes collective effect, when a larger group satisfies this criterion. The absorption of new information only results in successful action by a company, if the company utilises the information available to it. During the transition from knowledge and understanding to practical action are the most common stumbling blocks for effective business behaviour.

5.5 Knowledge acquisition

An organisation's ability to learn, depends not only the general willingness of its workforce to learn, but also on the newness and/or compatibility of knowledge acquired from a partner. Similar knowledge is more easily integrated. If different abilities are acquired from the partner, the result is a greater degree of learning. Alliances based on different starting capabilities are a good approach to the acquisition of new competencies (HAMEL, 1997a). One single technology is much easier to transfer and therefore to learn than a complex process competency.

The development of knowledge from internal knowledge sources starts at individual level, spreads via groups to the entire organisation and ultimately transcends the boundaries of the organisation (NONAKA, 1997a). Knowledge acquisition from external sources may take place through partnerships with universities or independent research institutions, collaboration with customers or the observation of competitors.

Learning from customers

The purpose of complaints management is to recognise customer complaints as an important source of information and actively listen to them in order to improve a company's performance. The aim must be not only to reduce the danger potential of unsatisfied customers, but also to profit from the user experiences expressed in customer complaints. This includes a process for reporting complaints as straightforward as possible and comprehensive complaint evaluation. As well as direct customer relations, Customer Relationship Management can be used to build customer-related competencies for a company (FRITZ, 2001). This requires a continuous process of dialogue, where the perspective is altered from the single transaction to the establishment and maintenance of longer-term business relationships with selected target customers (Customer Lifetime Value) (WEIBER, 2000).

Learning from competitors

Knowledge may also be acquired through the purchase of goods and services (Product Reverse Engineering) as the material outcomes of human

knowledge. It is also possible to headhunt individuals with expert knowledge, employed by competitors, thus importing (competitor) knowledge (PROBST, 1999c). Analogously, know-how may be obtained through business acquisitions. Synergy effects may be anticipated in relation to the reinforcement or transfer of existing competencies. Companies which acquire other firms, also frequently experience problems in precisely identifying and securing the desired knowledge. The critical to success expert knowledge is the implicit and hard-to-access knowledge of specialists (LEONARD-BARTON, 1995). This is one of the main reasons, why some companies prefer to avoid acquisitions and instead decide for close collaboration where necessary.

Interorganisational knowledge acquisition (cooperation)

Strategic partnerships are often entered into by legally and economically independent companies, which cooperate for the purpose of achieving a common goal. The interest in strategic partnerships is due to the growing acceleration of technological and market change (PUCIK, 1988).

Strategic networks

Network-like relationships are stable relationships between legally independent, but often economically dependent enterprises, which generally operate at different levels of the value-added process. Network structures have a significant advantage from a knowledge perspective in that the possibility of combining internal and external resources, can give rise to new areas of competence that may result in innovation on previously untapped markets (THIELE, 1997).

Strategic alliances

Strategic alliances are a horizontal coalition of at least two independent competitors, formed with the goal of combining their respective strengths in certain functions or areas of business through a time-limited cooperation in a particular geographical area (BACKHAUS, 1990) (SJURTS, 2000). In the context of knowledge, the focus is on the amalgamation and/or joint development of competencies (QUÉLIN, 1997).

5.6 Knowledge retention

Developing or acquiring competition-relevant knowledge is generally time-consuming and costly. As a complementary function to knowledge acquisition, the preservation of knowledge carriers in the form of people and materials forms another component of knowledge management.

Retention of relevant knowledge

Employees, who possess little knowledge and have low potential, are of very little importance (problem cases). Employees, who have low potential but a currently high level of knowledge performance (workhorses), are important at the present time but can be quickly replaced should they leave. Those, who have high learning potential and performance capability (stars), are difficult to replace. Valuable knowledge carriers should be identified at a very early stage and the company should work to ensure their long-term loyalty (ULRICH, 1998). It is important to recognise early on those knowledge carriers, who do not yet achieve enough compared with their potential, but promise high potential in the future. This primarily relates to the upcoming generation, but also to highly qualified employees, whose performance is still very variable (question marks).

Protecting knowledge against unwanted use

There is commercial legislation designed to ensure fair competition and protect personal creations. Patent rights, which protect inventors, are especially important as they affect knowledge with future potential. Copyright performs a similar function in literature, science and art. However, the resulting rights in form of job-related inventions often belong to the employer (WIEBE, 1997).

Overall, the legal handling of the ownership of intangible knowledge assets is much more problematic than the case with traditional assets. The legal right of disposal in connection with individuals, who possess knowledge, is first and foremost governed by working hours and employee protection law (HENTZE, 2001). Employers can protect themselves against the unauthorised dissemination of company knowledge by employees with the help of employment law (for example competition clauses).

Relinquishment of knowledge

Companies must divest themselves of irrelevant knowledge and profitably dispose of unused knowledge rights. Individuals who possess knowledge, will offload any knowledge which no longer seems useful in their role (for example skills or values).

Discussions

High wage costs in Western industrialised countries have resulted in the outsourcing of production of simple goods. Tangible assets are being displaced by intangible, often digital assets. The product of the future has a core of intelligence and a shell of service. The creative problem-solving ability of employees is an essential factor in knowledge-intensive businesses. Allowing individuality in businesses is costly, for securing sustainability it is essential. In all occupations, but especially in the case of decision-makers, intrapersonal and interpersonal

intelligence are of particular importance. They enable people to reach decisions in successful interactions with others. An environment must be created, in which many people can display their creative potential. The actions of managers primarily consist of communication. Social systems arise through and are sustained by communication. The communicative process determines the integration of the individual into the level of social subsystems and is essential to the existence and stability of a social system. The less problematic social relations are, the more easily factual information can be exchanged. Managers must have a strong awareness of their own limits and quickly recognise them in their team members to avoid mental illness.

Conclusion

Independent experts are responsible for organising their own work and they work for more than one customer. Because the status of an expert is subject to an accelerated ageing process, innovation, lifelong learning, relearning and unlearning are essential in order to keep pace with changing circumstances. The highest degree of individuality in the form of heterogeneous groups makes it possible to examine old things in a new way. The indispensable contribution of cultural, social and other aspects can be increased through migration. If we are to overcome new challenges, then being different, deviating from the norm, must be the rule. Ultimately, a business must have its own bundle of capabilities in order to achieve a degree of distinctiveness based on intangible assets. The in house development of the company's intellectual capital takes a long period of time. A business only has an advantage over the competition if it has the ability to develop and bundle particular capabilities from its own resources and deploy them effectively in the value creation process. Core competencies only provide differentiation where it is difficult for competitors, to imitate them. If knowledge about the effects of individual measures were not so diffuse, it might be lost very quickly through observation of the competition or the enticement of competent knowledge bearers. Every organisation attempts at least to some extent to protect applicable rules from changes and therefore against learning progress. This demonstrates the need to unlearn obsolete knowledge. This is true for both, the organisation and the people who operate within it. Unlearning is important in an organisational context, because it prevents wrong decisions from being made due to obsolete knowledge.

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The Learning Organization

André Luhn

Abstract

Why do organizations need to learn? This question will be discussed in this article, as well as the definition and characteristics of learning organizations. The reader will get a comprehensive description of a learning organization based on Peter M. Senge "The fifth discipline" to understand how a learning organization differs from traditional organizations. The final chapter will get an outlook that future learning processes within networks will have a stronger role, since it allows a better understanding between intraorganizational and interorganizational learning processes. Purpose of the article: This article will lead you within the topic of learning organizations. It will set a first input to different approaches how a learning organization can be defined and get established. Through this the reader will get an impression that a common vision is very important for these approaches. So this article will set a first trigger for the interested reader for learning organisations. Methodology/methods: Literature study for creation of new knowledge due to scientific work. Scientific aim: The reader will get a comprehensive description of a learning organization based on Peter M. Senge "The fifth discipline" to understand how a learning organization differs from traditional organizations due to literature study. The article will show that there is still a lot of research potential to create a role model concept for the implementation of a learning organisation. Findings: Due to the inconsistent research results further multifaceted approaches remain to gather further research results. As more people will be employed in organizations, communication will become a more important component within a learning organization. Further more a common vision is very important to establish a learning organization. Conclusions (limits, implications etc): Core issue lies in questioning how learning processes of individuals and within organizations are working. The various concepts for "learning organization" describing organizational learning, to constantly expand the learning ability of organizations and, consequently, the skills to solve problems from individuals and organizations itself. Here the integrative

approaches e.g. the fifth discipline try to close the research gap and clarify the phenomenon of organizational learning. (cf. Liebsch 2011:124). Due to the inconsistent research results further multifaceted approaches remain to gather further research results. As more people will be employed in organizations, communication will become a more important component within a learning organization. (cf. Unger 2002: 38). Different approaches showed the importance of communication within learning organizations as a fundamental component of those. Following the results of these concepts, it is important to promote collective learning processes so that organizational learning can occur. (cf. Unger 2002: 39). In future learning within networks will get a more and more important role, as it allows to foster the understanding between intraorganisational and interorganizational learning processes. (cf. Liebsch 2011: 124).

Keywords: *Learning Organization, The fifth discipline, Peter M. Senge*

JEL Classification: *M53 / J24*

Introduction

There is a plurality of factors why organizations constantly need to develop further and learn at the same time. Here, success is characterized by increased value added contributions, process enhancement and organizational competitiveness (cf. Wilkens et al. 2006: 124). Some authors even conclude, that the only constant is just the time, everything else is submitted to an more or less strong change (cf. Bock 2008: 12). The reason for that is a change, which does not move in predictable trends, because these trends can suddenly break off or develop in a different way (cf. Pfeiffer & Dögl 1986: 150).

Weitzel and Jonnson have presented a model of an organizational decay, which illustrates, in different phases, the possible effects of reactions according to disruptions on a specific organization (cf. Pieler 2001: 17 f.).

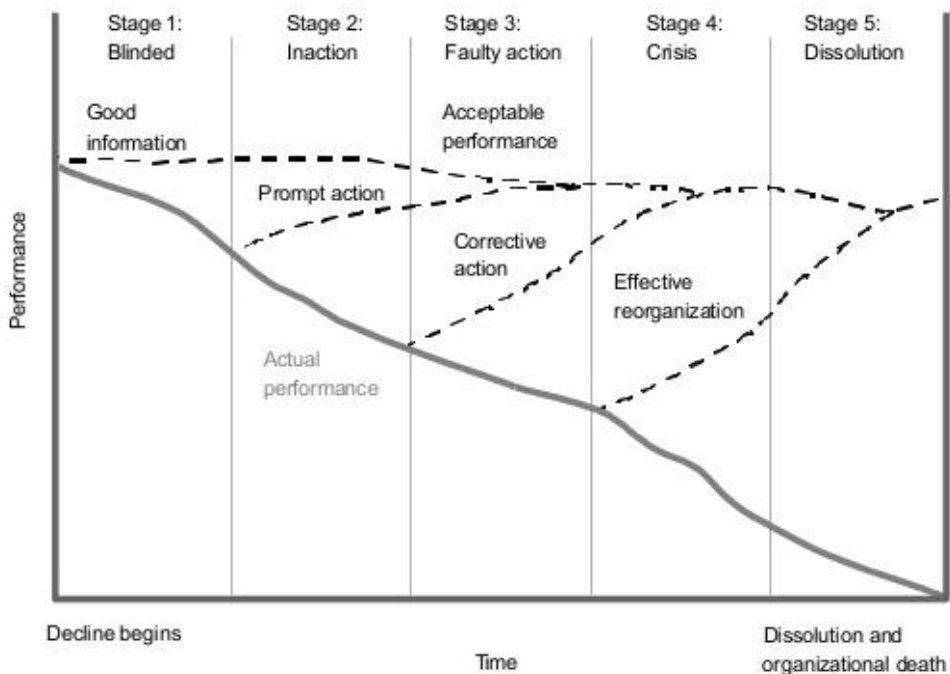


Figure 1: Model of the organizational decay according to Weitzel and Jonnson
(source: Pieler 2001: 17)

You are able to convey several characteristics within this model. A return to an adequate economic development of the organization is generally possible from each point, although the conducted effort increases by idle time. Moreover it can be realized that with a continuing absence of reactions, according to a decreasing performance, the breakup of the organization becomes more and more probable.

In order to reflect changes to the previous described thinks, the focus must now be on ways to still successfully run a business. For that the change has to be enforced in three dimensions (cf. Bock 2008: 15):

- 1.) Content concerning deepness
- 2.) Time concerning speed-up
- 3.) Sustainability with it's consequences

Furthermore change bases on three correlating levels, within these the included interactions have to be synchronized. (cf. Bock 2008: 15 f.):

- 1.) Of common life,
- 2.) The configuration of the performance processes and the determination of the trend by application of learned things,
- 3.) Responsibility and implementation of all involved parties by participation and comprehension

Here the synchronization of the three levels has to result in a continuous commutation of all in the organization involved parties concerning their variable base of knowledge, awareness and experience to develop a common mental model of a company which is developed constantly to participate in the constitution of performance processes according to the complete company. Hereby all members understand their contribution in an overall context and are able to regulate it, respectively its importance to have a leading stake in market success of the whole company. (cf. Little 1995: 206)

1 The term learning organization

According to Argyris and Schön an organization learns, for example, by acquiring understanding, knowledge, skills etc. for amplify its information base (cf. Argyris and Schön 1999: 19). Further definitions say that a learning organization is those which, offers all members the opportunity to learn to traverse a continuous transformation (cf. Pedler et al. 1991, zit. In: Sattelberger 1991: 59).

According to Senge a learning organization is a place, in which people “continuously deploy their capabilities, fulfill their true targets, in which new ways of thinking are supported and new common hopes are delivered, so organizations, in which people are learning how to learn together (Senge 2011: 13). According to Unger a definition of a learning organization can be summarized, that the organizational ability to learn is the potential of an organization which (cf. Unger 2002: 19):

- anticipates and face changes in an proactive way, which happen in the surroundings of the company
- prove and keep up the resulted flexibility by personal contribution
- identify and develop or rather selective change these mechanisms on its own

There is a continuous self-transformation of the whole company as a result of the mentioned characteristics (cf. Unger 2002: 19). Here, a special focus is set on the learning processes, which ensure the survivability of the company, because these are recognized and must be executed directly at the point of occurrence. This case depict integral requirement for adapt to the continuous increasing complexity of the company-surrounding. (cf. Hacker und Skell 1993: 1 - 421)

Liebsch characterizes a learning organization as follows (cf. Liebsch 2011: 29):

- learning organizations are relative opened systems
- learning organizations are relative dynamic systems
- learning organizations are relative underdetermined systems
- learning organizations are self-organized in an adequate way and structure- determined as well

A learning organization is classified as an open system, because these are in mutual relationships with their surroundings and information reach inside the system of the organization. But the organization is not able to influence the system-surroundings by own learning processes. The continuous changes, which are generated by

learning processes, have a share in the dynamic of the learning organization. Because of the stamping of the organizations, in terms of establish rules and structures, it works to use learning processes in an effective way but also to hinder them, why you can speak about determined stampings in this case. That an organization is able to survive, it is important, that it can soak a possible freeze by self-regulating processes. To implement this, learning organizations are structure-determined and self-organized. (cf. Liebsch 2011: 29 f.)

2 Characteristics of a learning organization

In the literature a clearly pretended vision proved as a strong distinct characteristic of a learning organization. So, for example, Bertels point to the importance of a vision in learning organizations: The vision composes, in relation to the level of sense, the equivalent to the realization of profit as a right to exist at the economically level. (Bertels 1997: 212) Further he mentions the vision as basic concept of the organization, on which a common basis of values is generated for create a feeling of togetherness, which serves as a distinctive feature to other companies (cf. Bertels 2008: 77).

According to Walz and Bertels, just visions animate company-strategy (cf. Walz and Bertels 1995: 25 f.). One of the main characters is Senge, who claims in an applicable way, that ambitions, hopes and wishes of all parties have to be compacted in a common vision (cf. Senge 2011: 233 - 253).

This vision should come up to the various needs. The people need to share the visions and cheer themselves on.

This can be realized when people become a “further creator” (Senge 2011: 233) of the vision. In addition, this vision should be based on long term considerations, for example by establishing a “lodestar” (Senge 2011: 245) and it has to provide information concerning the potential target of the pursued vision. Especially executives and supporters have to exemplify participation and engagement, for reaching the vision, through one's own life. These employees holistically agree to the vision and therefore they work in a dedicated way to pervade it. Afterwards this vision will be fixed inside the guiding idea of a company. (cf. Senge 2011: 233 - 253)

Senge gives an example for this:

When the employees of Matsushita cite the company's motto: <<We want to come up to our responsibility as an industrial worker, push on the progress, support the common good of the society and campaign for the enhancements of the global culture>>, they describe the purpose of the company. When they pitch the

company's song <<We send our products to the people of this world, endless and continuous, like water, which pours out of the spring>>, they declare the company's vision." (Senge 2011: 244)

Additionally to a vision, further characteristics, which distinguish a learning organization, are described. So, Kröll and Schnauber characterize these in the following way (cf. Kröll and Schnauber 1997: 6 f.):

- Value added- and customer orientation
- Continual improvement and establishment of a system for lifelong learning
- Utilization of teamwork
- Integration of the permanent learning process as well as a continuous renovation of the business organization

Among other things, customer orientation is also highlighted by Bertels, because it is helpful for obtaining an external benchmark for the market-performance of the company, because customers represent the right to exist of each company (cf. Bertels 1997: 213 f.).

Bock amplifies the requirements of a successful acting, learning organization. According to him, such an organization possesses the ability for interpret, collect and modify relevant knowledge in a reliable, purposeful and continuous way for its implementation in concrete arrangements.

Furthermore a successful learning organization is able to adapt its behavior to other environmental conditions and reflect the new perceptions.

A terminal characteristic is the ability to generate results, which reflect a high level of relevance for the employees of the company and have a share in the company's success. (cf. Bock 2008: 24)

As a last point, the requirements are complemented with the ability of the organization to install a system of working feedback-loops, because these are necessary to learn from mistakes and to implement a circle-causal process, which empowers the organization to learn in a generic and self-reliant way (cf. Walz and Bertels 1995: 213).

3 Description of a learning organization according to Peter M. Senge "The fifth discipline"

"How is it possible, that a team of engaged managers, which have an individual intelligence quotient of over 120, only have a collective IQ of 63?" (Senge 2011:

20). The five described disciplines of Senge should prohibit this by an organizational structure, which supports the continuous learning and development process. The fifth discipline wants to increase the organizational base of knowledge and values, intensify the relationships between the members of the organization, improve the problem-solving and handling skills and the happening of the organizational system should be understood (cf. Heftberger and Stary 2004: 32 f.).

The approach of Senge is not understood as a guidance for organizations to learn by himself, but as an impulse to review company occurring cultures, structures and processes (cf. Knipp 2014: 54).

For Senge, a learning organization is: “[...] a place, where people think continuously, that they generate their reality by themselves. And that they are able to change this reality. As Archimedes said: “>> Give me a lever, which is long enough... and I will move the world with just one hand. <<” (Senge 2011: 24).

The five disciplines are (cf. Senge 2011: 17 - 22):

- Systems thinking
- Personal mastery – self-management and personal development
- Mental models
- Common vision
- Team learning

The most important discipline in this model is systems thinking, because it is the special discipline, which connects all the other ones and which is significant for change processes within the company.

Within systems thinking, Senge describes, that corporations are systems, which are connected by an invisible netting of coherent actions. Here, systems thinking is a conceptual framework, so it is a set of information and tools, which was developed within the last ten years focusing the target of recognize and understand comprehensive designs for change them after this. (cf. Senge 2011: 16 - 17)

Systems thinking is an integrative discipline, which connects all the other ones and merges them to a holistic theory and practice.

It prohibits also, that several disciplines are getting isolated, because the vision would collapse without a holistic consideration. (cf. Senge 2011: 16 - 17)

To manage the increasing complexity in organizations, system theoretical and constructivist aspects have to be focused in relation to the theoretical and practical implementation of a learning organization. (cf. Wahren 1996: 72).

Here, Senge describes three basic modules in a display of thinking, which is distinct in a system-orientated and dynamic way (cf. Senge 2011: 86 - 112) as well as nine system-archetypes (cf. Senge 2011: 451 - 465). These basic modules are:

- Self-enforcing feedback processes
- Balance processes,
- Delayed impact.

The causal cycles form the nouns and verbs of a system-oriented thinking and acting (cf. Wahren 1996: 72).

The causes of growth processes in a organization, are, according to Senge, the self-reinforcing feedback processes, because these work as a motivational function engine and roll by their own like a “snowball” due to preferable-feedback (Senge 2011: 102).

It can be concluded, that there is nothing more essential than success, since it ensure for more success. (cf. Wahren 1996: 72). The self-reinforcing feedback processes are illustrated by the following graphic.

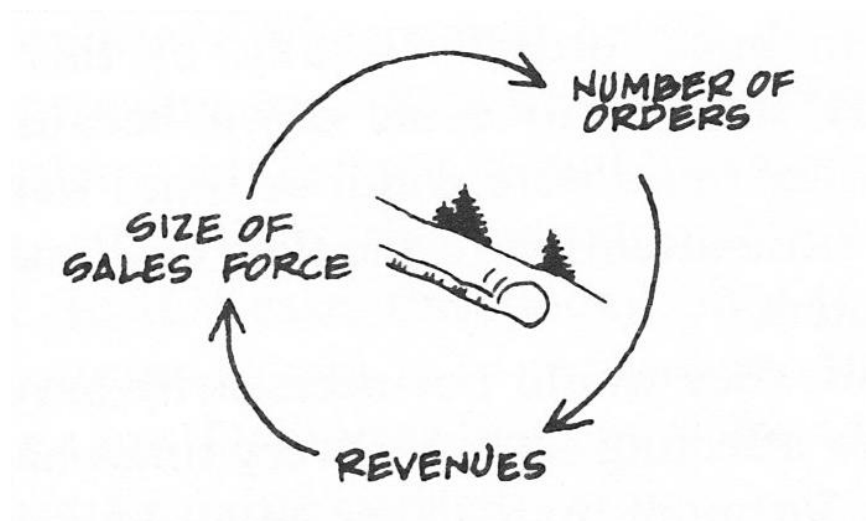


Figure 2: Self-reinforcing feedback processes according to Senge (source: Senge: 2006: 117)

Senge describes the existence of balance-processes, because an organization want to maintain for a definite target position. Here, the function is taken by a balancing and stabilizing system. He describes it, referring to the human body, as an ability within a changing environment, to preserve the survival conditions. (cf. Senge 2011: 104)

The following graphic describes the balance-processes:

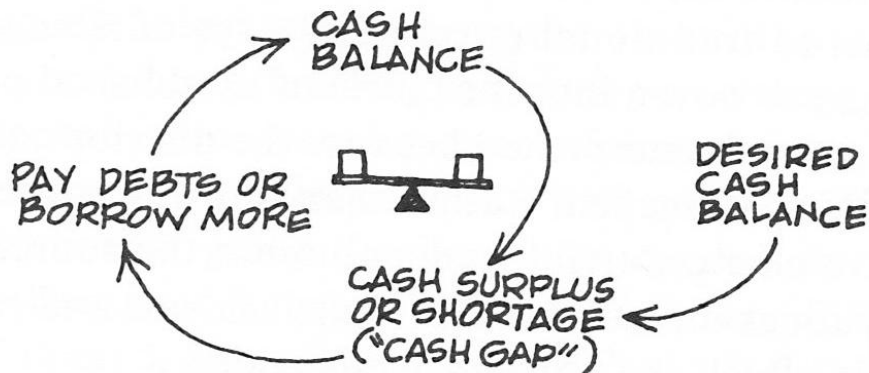


Figure 3: Balancing Processes according to Senge (source: Senge: 2006: 87)

Delayed impacts are the last building block, which describes effects on a particular variable to the next one with a delay (cf. Senge 2011: 110). This means that, the influence cycle is temporarily interrupted and the effects will only entry after a certain behavior or a particular measure. (cf. Wahren 1996: 72 - 74).

The following graphic illustrate the fact:

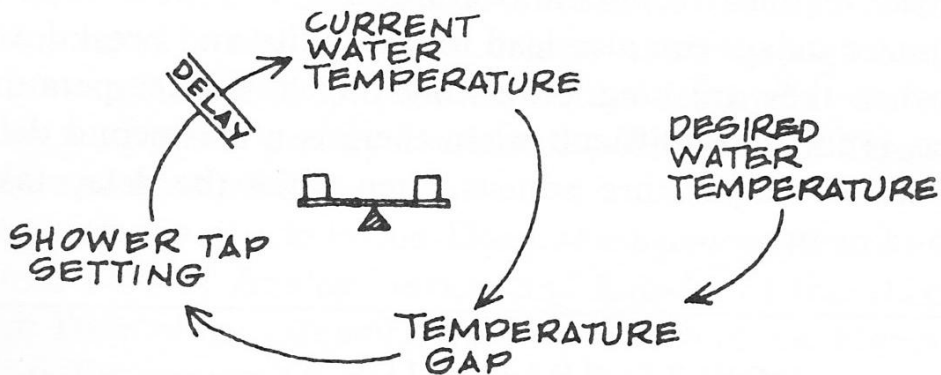


Figure 4: Balancing Process with a Delay (source: Senge: 2006: 89)

Building on the three blocks, Senge mentions nine system-archetypes, which constitute system structures. Those keys symbolize, when somebody want to learn and how it's possible to recognize these structures. (cf. Senge 2011: 113 f.) Here the recognition is important, "unaware structures keep as imprisoned" (Senge 2011: 102), wherefore the recognition arise for the possibility to start selective

change of the organization and divide the findings with other individuals. (cf. Wahren 1996: 74).

Furthermore Senge describes seven learning barriers of companies, which operate our behavior and cause fundamental learning barriers, because of the current prevailing planning and leadership methods as well as thinking and interaction methods. (cf. Senge 2011: 29 f.).

The first learning barrier is „>>I am my position<<“ (Senge 2011: 30), by people are always describing the tasks, which they daily perform to earn their livelihood, but not the purpose of the greater business, in which they are involved. This fact is conditional by the topical self-image of employees, how identify themselves as a part of the system on which they have only a few or no influence at all. (cf. Senge 2011: 30 f.).

The second is „>>The enemy out there<<“ (Senge 2011: 31) and is a by-product of the identification with the own workplace, because thereby arise an unsystematically world view. For this reason, employee's don't arise their contribution and influence to the whole-company and shift the blame on other people but not on themselves. (cf. Senge 2011: 31 -33)

The learning barrier „>> The Illusion of Taking Charge << - or the Illusion of control“ (Senge 2011: 31), says, that the knowledge production, which means that oneself contributes to the problem, automatically lead to a proactive approach (cf. Senge 2011: 32 f.).

The fourth learning barrier „The Fixation on Events“ (Senge 2011: 33) is the focusing of short-term results. These promote neither the learning nor the creativity of the employees. Instead of focusing on short-term results, organization has to focus long-term conditions to support the learning and the creativity. (cf. Senge 2011: 33 f.)

The learning barrier „The Parable of the Boiling frog“ (Senge 2011: 34), describes the inflexible of organization by slowly rising existential threat. Like the frog, whose be attuned to internal perception of suddenly changes in his environment, company's don't recognize the increasing threat early enough. For the solution it is important to pay attention of sensitively subtle and not only the dramatically things, so that can be oppose to against small changes immediately. (cf. Senge 2011: 34 - 36)

The sixth learning barrier „The Delusion of Learning Experience “ (Senge 2011: 36 f.), describes, that it is to believe realistically that one learns from experience, because when the consequences of our choices are beyond our horizon, we can't learn from our direct experience. (cf. Senge 2011: 36 f.).

The last learning barrier „The Myth of the Management Team“ (Senge 2011: 37 f.), says, that Management-Team members don't respond their doubt, which leads to softened compromise and to be avert learning, when you tries to cover the uncertainties with played competence (cf. Senge 2011: 38 f.).

The discipline Personal Mastery, which is standing for self-management and personality development, describes, that every individual bundled their energy within an organization, the personal vision continuously clarifies and deepens and has the patience to developed and considered the reality objectively (cf. Senge 2011: 17). Hereby the principle of creative suspense is the central element of personal mastery. Senge describes this with the gap between the vision and the reality. On the basis of gap arise stress between the current reality and the vision. These stress can be relax when the vision is pulled to the reality or the reality to vision. (cf. Senge 2011: 165 f.) Moreover the creative stress energy donate to achieving the objectives and thus declared the mental basis organizational learning not only as an exclusive information reception, but rather than realization of individual targets. (cf. Heftberger and Stary 2004: 34).

Following figure illustrate the above mentioned information:



Figure 5: Creative tension within the personal mastery discipline (source: Senge: 2006: 140)

Senge provide the structural conflict on this basing, which present the conviction of humans, who find to out the own authority and worthlessness and therefore they are unable, to satisfy their desires.

The following figure clarifies the facts:

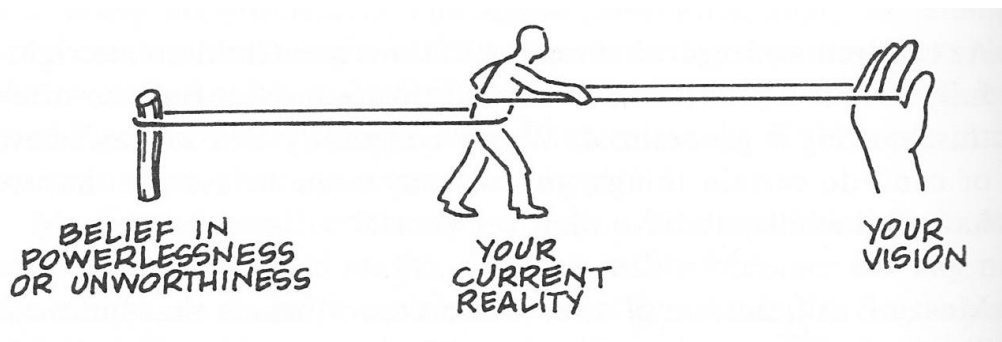


Figure 6: The authority of the own powerlessness (source: Senge: 2006: 146)

Thereby the creative tension tried the person to pull in direction to vision, in the same time the second elastic band, the structural conflict, pulling back to their basic beliefs, that they can't do everything what they want and wish. (cf. Senge 2011: 172 f.)

To solve the structural conflict, it is necessary to change the convictions. (cf. Senge 2011: 175)

Also Senge provides the engagement of organizational users, as a mainstay of the way to present a learning organization, because the engagement of an organization can only be as much as the engagement of their members.

On this basis, you have to be clear what things are really important to us, so that life may be hereafter placed at the service of the higher objectives.

Within the Personal Mastery, Senge now getting conjunction between individual learning, learning organizations and the special spirit of a company that holistically consists of learners. (cf. Senge 2011: 17 f.)

The mentally models are ingrained assumptions, generalizations, pictures, or symbols, which have a high influence of the perception of the world and the plot, which be in progress within those.

In dynamic environmental conditions institutional learning processes are very important according to Senge, that Management teams change their common mental models in relation to the company, his competitors and markets.

The capacity to have intensive learning conversations, to ask curious, to take up the own position but to be open to think about other opinions, is a very important sense. Therefore is the first cut to motivate the employees to reflect itself by work with mental models and discuss the modern generalizations together. (cf. Senge 2011: 18 f.)

When teams are truly within a learning process whose intelligence exceeds that of a single individual is by far and the team is to develop capable extraordinary abilities for coordinated actions.

The team-learning describes for Senge the base of the learning organization. He attaches on two examples. When teams are truly within a learning process those intelligence exceeds in comparison to a single individual and the team able to develop capable extraordinary abilities for coordinated actions. Further outstanding results are the result of team-learning process and the outcome that individuals develop much faster than it would ever possible on another way. (cf. Senge 2011: 20 f.)

To identify this successful result, the process begins with a dialog within the team, during this own assumptions are not longer important because everybody is engage in a common thinking.

It is always important during this process, that the interaction-structures get detected, which is to impede the learning in the team. (cf. Senge 2011: 20 - 22)

Senge describes in the last discipline the vision. The organization must be establishing a common vision for the future, in which people are included by a shared corporate philosophy and the feeling is matched of the common destiny.

The trick is to transfer an individual vision in a collective vision to promote at this by common future scenarios genuine commitment and the participation of the people on the vision. (cf. Senge 2011: 233 - 237)

The content-related topics cannot be allowed to dictate in the vision, but in accordance to Senge the results, which are the result of reflection processes and communication processes. (cf. Senge et al. 2000: 345)

In a nutshell, a vision always should be tangible and desirable, so that the employees of the Organization will improve constantly and learn on the way by achievement of objectives to the vision. They must be convinced that the taken way is the right one to achieve the vision.

You can find more information about the importance of a vision in the section entitled

„Characteristics of a learning organizations“.

Senge finally remarked that the exercise of a discipline is never concluded and thus be present a continuous learning circuitry. Best-Practice solutions are reality checks, however have the risk, that this be imitated and it is easy to miss the pace

to the latest developments. After Senge believes good organization cannot arise through imitation. (cf. Senge 2011: 20 - 26)

4. Conclusion and outlook

A learning organisation distinguishes itself by the fact that her actors think often, consciously and together about her selfdraft, her action and the achieved results.

Besides, they develop ideas for changes and move this in structures, processes and measures.

The ideas of learning organizations are arise for the fact of steady growing momentum and complexity of the environment (cf. Unger 2002: 38).

The aim of a learning organisation is a continuous organisational development. With this the company extends constantly his ability to form own future creatively and to adapt itself to changed market conditions.

Core issue lies in questioning how learning processes of individuals and within organizations are working. The various concepts for "learning organization" describing organizational learning, to constantly expand the learning ability of organizations and, consequently, the skills to solve problems from individuals and organizations itself. Here the integrative approaches e.g. the fifth discipline try to close the research gap and clarify the phenomenon of organizational learning. (cf. Liebsch 2011:124)

Due to the inconsistent research results further multifaceted approaches remain to gather further research results. As more people will be employed in organizations, communication will become a more important component within a learning organization. (cf. Unger 2002: 38).

Different approaches showed the importance of communication within learning organizations as a fundamental component of those. Following the results of these concepts, it is important to promote collective learning processes so that organizational learning can occur. (cf. Unger 2002: 39).

By implementing a learning organization the advantages are a higher problem solving ability, a value increase of the human capital, reduction of risks within decision-making processes and a higher satisfaction of the employees.

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Education Support By Research in Local Transportation History

Juraj Štefanovič, Frank Schindler

Abstract

Aim of the article is to present our research dealing with virtual reality modeling and education activities. It involves a chain of development steps: taking pictures of objects, collecting information, creation of 3D models and panoramas, setting up the interactive virtual reality environment along with educational support and testing the user experience with students. Methodology/methods of work: the creation of 3D models and panoramas is done by taking pictures of real objects and using them as textures. The education materials are created as interactive presentations and the usability testing of these presentations should be planned. Scientific goal is to measure the quality of interaction by this education support in order to derive rules testing effectiveness of support, interactive applications and presentations. Findings: 3D models and other educational support materials may be created voluntarily by teachers. The open source library for many different models should be created by whole community provided suitable interfaces of modeling tools will be arranged. Conclusions: Complex educational and interactive materials including virtual reality and panoramas are satisfactory when combined with easy 3D models that are made from taken pictures, which could be made by teachers themselves and/or open communities by existing cameras.

Keywords: Virtual Reality, Augmented Reality, Usability Engineering, Web Based Training, UI/UX Design, E-Learning.

JEL Classification: I20

Introduction

Traditional way of learning is based mostly on abstract perception of data and logical reasoning or rhetoric about them. In modern times, often the Google search and investigation could be added. Having only the abstract perception, or large amount of available data also, the students will forget most of information soon. Having not any general idea or broad overview of subject matter, they are disoriented or missing the sense and value of learning process. Better understanding of general idea and sense of learning subject could be also made possible through direct experience. Two main possibilities are available to overcome this problem. At first, the practical experience in the real conditions by visiting museums, real objects and processes, by taking part in related activities. At second, the virtual and augmented reality provides opportunity to experience some real-like level of contact with learned subjects, in form of play with them without dealing with real conditions. To summarize, learning process needs to include sort of striking experience, as a magic moment, which allows us to glue all other learning information together, to set a central point of sense, interest and overview. Contemporary technologies for virtual and augmented reality could be strong and immersive help for users that are suitable when used for learning process in such a way.

Traditional learning distributes all topics to humanity or technical branches. Certainly, in real life the connection and impact between technical disciplines and humanities is very intense. Perhaps, one very significant method to understand this connection is to study history of technology, where all reasons and consequences show strong connection between human society and technology.

1 Educational Models of Historical Monuments

Current project running at our institution includes a work of mixed research teams on creating 3D models of historical, cultural and natural monuments and proposing methods of interaction by educational use of these models (Ružický, Schindler 2015). 3D models of buildings are enhanced with meta-information as texts or sounds. The exterior or interior panoramas are processed with source pictures, which are obtained manually, or by flying drone cameras. Flying drones allow taking not only bird's perspective of viewed pictures, but also the right picture positioning for building sides to get proper textures. The virtual reality models are the first step and the augmented reality is then taken as perspective. As the cheaper devices will be widespread around users including for example Oculus Rift™ device, which is going to be used here. Process of creation of the 3D models and their presentation is also the educational part of research, with participating students helping to develop models and targeting schools they could use our project results. The work process is divided into four stages:

- a) sensing stage: photos, videos, information
- b) modelling stage: 3D geometry, textures, panoramas
- c) assets stage: models, texts, sounds
- d) presentation stage: scenes and databases.

For educational purposes, the 3D objects are coupled with additional information and the optimal result is a storytelling, which enhances the process of learning. Main possibilities of complex presentations are these:

- 3D interactive model of interior/exterior
- additional pictures and pictures from other sources
- interactive panorama views
- text information and links to other sources
- short tutorial movies or movies with story
- interactive storytelling
- interactive games
- sounds, interviews
- animation (development in timeline)
- questions and riddles to solve.

High quality 3D models are rather complicated and expensive to create. More practical could be models created by image-based rendering techniques. Any user may take pictures and participate in database of models. Creation of models should be interactive and more or less automatic. Complex presentation possibilities (such as above) do not need high quality 3D models in every single case. Perfect examples of user contributions are in Langweil's model of Prague's city centre (City of Prague Museum 2009). Mr. Antonín Langweil made the well-known large paperboard model of city centre in years 1826 – 1837, where all textures resp. pictures of houses are patiently handmade drawn on paper. Based on his work, the digitalisation project of this model was made in modern times and remarkable 3D model from 19. century is ready, although Mr. Langweil died in poverty. Today, anyone can contribute in such a way and modern technology makes it much easier. The model in scale 1:480 contains more than 2000 buildings and occupies about 20 square meters. After nearly 190 years, half of the buildings does not exist anymore.

Old buildings of castles are mostly in the state of ruins. The model should be made in different historical steps, including previous situation and architectural development, until the final contemporary state. The search in literature with help of other contributors is needed and only the ruins now can be documented by

modern camera technologies.

In the case of virtual reality, not only the 3D object itself, but its environment must be created too, because the user is placed into the environment using 3D eyeglasses. The exterior can be made as a universal platform of photorealistic environment of nature or some buildings around and each desired 3D object is placed in it (Lacko, 2015). The navigation of user in this virtual environment can be free (walk and fly mode), or restricted to isolated viewpoints, where another information may be connected - text, sound or other image details.

In comparison, the virtual reality is more complex thanks to the immersion into fully rendered virtual world, whereas the augmented reality is more complex since of the need of precise positioning of real and virtual objects together. Augmented reality is optimal for storytelling mode of presentation, where suitable markers could be connected with all supplementary information and smartphones can be used. The interface might be placed on the device application and input, or virtual interface through various sensors should be used.

2 History of Transportation

New version of project is based on the same educational platform and 3D modelling. The subjects are technical memories with focus on the history of transportation: railways, highways and others. Traffic infrastructure and society have great mutual impact on the society. Technology and society are closely interconnected throughout history and economic relations. Technology developments in 19. and 20. century may be presented through the ages of steam, oil and electricity used in the transportation. The same development is running through the ages for steel, aluminium and composite materials, including logistics, planning and information technology. Transportation technology develops the connection between regions and has economic and cultural impact.

History of transportation is a good central topic for development of software and multimedia solutions based on virtual and augmented reality, when supporting the desired cross-border education in high schools in Czech Republic and Slovakia. Historic territory of Austrian-Hungary made a large development of railroads in the 19. century and this first in modern period transportation system connected whole country itself and also with the rest of the continent. For example, our neighbour countries in central Europe had similar oldest buildings of railway stations, if some still remain. The other kinds of old transportation relics demonstrate the same connection: made in one region and used in the other, or constructed with workers and companies from distant provinces.

At the beginning, the creation of 3D models and educational materials was made mostly by IT experts. Advanced period should bring systems, where the teachers might prepare educational materials and 3D models by themselves. This is a possibility to create large, spontaneous and open-source database used for study

and education, similar to Wikipedia and others.

3 User Experience Research

Creation of educational tools is also a creation of user interfaces. The quality of educational material is not only the case of pedagogical quality itself, but it is the case of usability, the quality of understanding and orientation within given interface - paper textbook or software application. From the pedagogic point of view the study material should be selected carefully, but its suitable presentation or *interface* is another point. To follow textbooks: we could compare old black and white easy textbooks of English language with contemporary colourful textbooks containing many vivid pictures and various design features. In the case of software applications, the usability and user experience are studied to great extension, due to many design problems in this relative new branch of engineering, for example: (Norman 2013, Andrews 2016).

Design for usability is an important feature for human-computer (human-technology) interaction and it may be critical in the relations between producers and users. The success of e-learning and other kinds of education in schools is dependent on usability design too. Usability and UX (User eXperience) is an interdisciplinary branch, assembling specialists from information technology, psychology, team-management, sensory technology and others.

In the domain of learning and e-learning, the teachers should get more overview in UX: increasing the public awareness should avoid some negative effects which are caused by very quick development and design shortcomings, when nobody is able to express professional criticism towards software applications regarding UX. Strong control of UI/UX design is very important by these application development, for the user interface is the key feature for learning and e-learning.

The components of UX research in education process:

- methods of design for usability are well developed by professional companies and they should be transferred to pedagogical and educational environment, which is a specific user category.
- teachers and students should be able to evaluate UX quality in more professional way, to distinguish bad design from other educational shortcomings,
- development of educational tools might contain standard methods of design for usability, which are used by professional designers,
- teachers and schools should be able to judge quality of educational tools, before making investment into it and asking for better quality.

4 Sources of Information

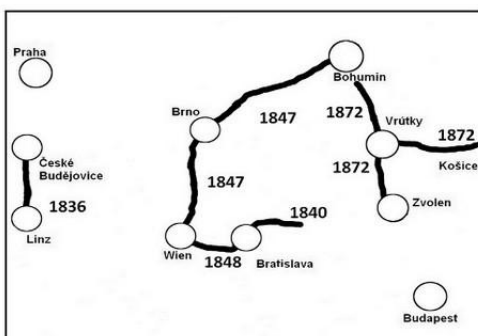
Many historical relics of transportation technology may be found in the countryside and in cities. The creation of virtual reality 3D models could be made and all its models ought to be enhanced by other information and interconnected via some historical, societal and technological basis. Useful information might be collected elsewhere, for example from the time of construction of railway in the area of Kremnica town that is mentioned in the autobiography (Zechenter-Laskomerský 1915) in Slovak language, part II/2, using the search keyword „železníc” repeatedly in that text to find many relevant memories to this subject. Set of found examples for historical transportation subjects are on (Fig 1) and (Fig 2).



a



b



c



d

Source: author's images

Figure 1 *History of transportation - examples*

On Fig 1 (a) the steam locomotive in Nitra town exhibition fair. (b) Narrow-track locomotive with tourists by Čierny Balog village. (c) First sections of railroads in Austrian-Hungary, 19th century. (d) An aircraft *Caproni* from the age of WW-I, non-flying replica at temporary exhibition in Bratislava castle.



a



b



c



d

Source: author's images

Figure 2 *History of transportation – more examples*

On Fig. 2 (a) local ferry at river in Vlčany village. (b) Local „skyscraper” in Zlín city (red coloured), built in 1938 by Baťa company which contains an unique lift: the vertical travelling office room 6 x 6 m for boss, also equipped with water tap. (c) One piece of original mast from former cableway (built 1954) up to Chopok mountain (2023m) as historical monument placed into valley. (d) Highway viaduct 1035m long under construction in 1981, Podtureň village, Liptov region, northern Slovakia.

5 The Project InovEduc in Details

A project target is the integration of software systems based on virtual and augmented reality, with visualisation of 3D data and panoramas. The reason is a support of education at elementary and second level schools. Besides, a bilateral cooperation between schools in Slovakia and Ukraine is supported by this project. The project output will be the virtual and augmented reality presenting selected set of historical buildings and other relics of nature and culture. Three modes of presentation are under preparation: virtual reality, augmented reality and the webpage interactive presentation.

From technical point of view, the system of virtual reality is based on the Oculus Rift™ device, which is able to visualize 3D and panoramic scenes. Augmented reality 3D and panoramic is created with the use of tablets and smartphones, running the operating systems Android, iOS. Web-interface for 3D and panoramic visualisation is based on Unity 3D system.

Input data are given as 3D models of architectural monuments and natural relics, exteriors or interiors. Data are elaborated from video stream, using the flying drone to collect aerial snapshots. The drone is useful to take right oriented pictures from building details above the pedestrian perspective, to get textures and whole scene shoots. Additional information is added as text data with descriptions of objects. Suitable sounds are added to create and enhance mood.

The presentation will contain altogether 14 objects from eastern Slovakia and 10 objects from western Ukraine. Objects in Slovakia include one castle ruin Zborov and five original wooden churches in villages Topoľa, Ruský Potok, Šmigovec, Inovce, Hrabová Roztoka. Objects in Ukraine include two castles: Uzhgorod and Nevytsky, and two wooden churches.

Desktop application for virtual reality, based on Oculus Rift device is used to show single scenes with objects or to allow controlled walking and desired objects selection. Information about each selected object will be available, with specific help. Each object is placed to its corresponding scene.

Mobile application for augmented reality data visualization is made under operating systems Android and iOS, including text and simple image information too. Navigation is implemented here as a marker detection. The marker is printed on paper plate.

Web application for data visualization on the webpage allows showing objects placed to corresponding scenes and controlled walking is possible too. Navigation is handled with mouse. Web application in COLLADA data form allows teachers and students to add and visualise their own simple 3D models, created in COLLADA data format, enhanced with object description.

To collect data and images, all monuments and relics are visited personally by project team members. Here is typical data specification, what must be collected in terrain for wooden church:

Taking pictures

3 different panoramas of interior, textures from exterior,
images shoot with drone

Additional data

ambient sound, sound of bell, text description and information,
some important details if available

Output

3D scene, added environment (trees and panoramic country),
exterior and interior panoramas

Web presentation

video of exterior made with drone, entering through building
entrance,
3D models, text information, controlled walking

Augmented reality presentation

3D model with small environment only, panoramic interior, text
information

3D models: resolution up to 65000 nodes

Textures: resolution up to 512 x 512 pixels, JPG without compression

Panoramas: 360 degrees horizontal, 180 vertical, JPG without
compression, 20-30% overlapping

Various software tools are used step by step to develop models and to
prepare scenes for virtual and augmented reality:

SketchUpTM – terrain modeling

Autodesk 3ds MaxTM – 3D object geometry

Adobe PhotoshopTM – textures to create and develop

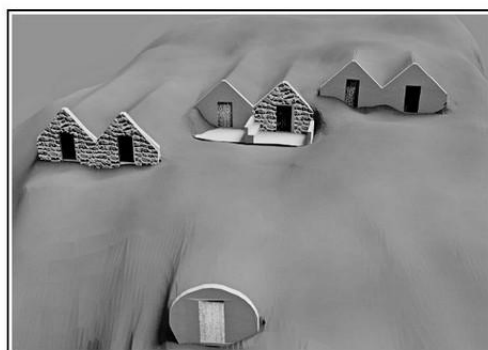
Unity3DTM – final scene construction, adding textures, environment,
interaction

VuforiaTM – object recognition under Android applications

Pilot application was created for desktop and for Oculus Rift. The wooden
church from Topľa village was chosen as one the first testing objects, see Fig. 3
and 5.



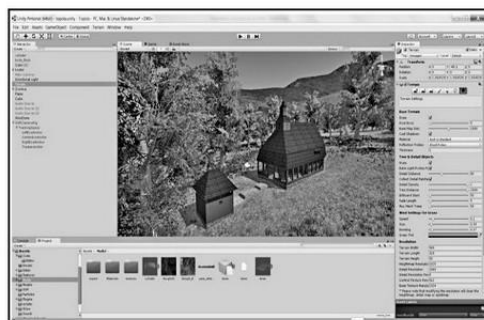
a



b



c



d

Source: images from this project work

Figure 3 Project InovEduc: preparation of visualisation

On Fig. 3 (a) old synagogue in Bardejov town, made as 3D model prepared for visualization. (b) Wine cellars in Veľká Trňa village, basic 3D model including the terrain shape. (c) Wooden church in Kostryna village (western Ukraine), a more complicated 3D model composed from textures. (d) Wooden church from Topoľa village, placed into 3D environment by Unity3D software.

6 The Usability Testing Laboratory

We started to create a laboratory for usability testing. There is a dedicated room and some special software to practice test process. Creating the web presentation and virtual reality presentation on the computer screen, we will experiment with test users, students and teachers, to find their attitudes, opinions and suggestions when the created interfaces are used.

Usability testing can be made by various scenarios and modes. There is a difference, when testing the use of desktop or mobile devices and applications, a

difference between user groups of various age, etc. In our laboratory and targeted application, basic test methods are these:

Effort measurement – time of task completion, how many steps were used for task, how many features can user remember after test, how many critical comments, dead time of thinking.

Loud thinking – the user is asked to talk and comment everything when doing the test. This can be easily achieved when two users are working together.

Retrospective thinking – after the test work, the recorded video is watched and discussed with test user once more.

Heuristic testing – authors of application are doing the test by themselves, trying to determine whether the interface design will be right understood by users or not.



Source: author's images

Figure 4 *Usability testing laboratory at Faculty of Informatics, PanEuropean University*

On Fig. 4 is our new laboratory, being prepared from spring 2016. It is arranged in classical way, two rooms are divided with large semi-transparent window. Running the test process, observers are sitting in that darker space as seen on Fig. 4 and the test user(s) behind the window are not disturbed by the presence of other people. When not any test experiments are running, both rooms are used as computer labs or conference room.

Basic hardware on the observer's side with three desktop computers: a mirror monitor to see what the test person is doing, a camera monitor to record multimedia stream and the third computer for various purposes – help, comments and presentations via picture projector.

Basic hardware on the test person side is a standard desktop computer, or laptop computer, or tablet and two cameras for recording the work – a whole room and desired detail. Intended purchase for this laboratory is eye-tracker and mobile device stand, which enables more easy to record the detailed observation of user's fingers at work.

Software suitable for test process is TeamViewer™ (<http://www.teamviewer.com>) which is installed in our laboratory for non-commercial use being our first tentative alternative. The observer can not only see exact copy of test user's computer screen, but to interfere and interact directly with mouse to the work, for example the one person can click or draw with mouse to the other computer screen. Recording functionality of the on-screen work is included. There is a discussion of other possible licences and software tools. There exist various other applications. For individual purposes, when very informal testing process is experimented using one isolated computer, the free HyperCam™ application can be downloaded and installed, which is recording the work on your screen and sound (<http://www.hyperionics.com>). Known professional product is Morae™ which allows observation and collaboration remotely in real time (<http://www.techsmith.com/download/morae>).

Testing process is inevitable part of software interface design. Creating the application for study and pedagogical purposes, there are two different quality features: a quality from pedagogical point of view and a quality of interface itself – how it can be understood and controlled in effective way. These two features should be distinguished correctly in applications and textbooks also.



Source: author's images and this project work

Figure 5 *Augmented reality presentation, an interaction between tablet and paper marker*

On Fig. 5 the wooden church in Topol'a village is visualized by easy today accessible augmented reality method. Tablet shows the picture from its own rear camera. A software tool is analysing this picture to find the marker graphics printed on paper and another software tool places 3D model to the right position and orientation via marker. Moving the tablet and/or marker position, the user is able to overlook the whole model in various angle and distance. Tablets and mobile phones are widespread today and can be used in such a way by the educational process at school, or directly in museums and open area exhibitions to give additional experience and knowledge.

Conclusion

Present project is collecting the experience with a set of cultural historical objects in eastern Slovakia and the close neighbouring part of Ukraine - these objects, mostly old valuable wooden churches are shot by cameras. Corresponding 3D models are created and prepared for educational activities. Project output will be tested by teachers and students by educational activities. This Slovakia-Ukraine project *InovEduc* (Innovative methods of education and partnership support) is supported by Norwegian grant and co-financed by the state budget of Slovak Republic.

Opening conference of this project „Innovative methods in education and research“ was held in Košice. Project partners and research workers came from Slovakia, Ukraine, Czech Republic and Norway. Project will be finished in April 2017. This work was supported by Norway grants, by the project CBC01008 Innovative Methods in Education for supporting Partnerships - *InovEduc*, under the Programme area SK08 Cross-border cooperation.

The next project will focus on selected topics in transportation history, to integrate technical features along with history and society. Interactive presentation of history in virtual and augmented reality is focused on technical remains and objects from the past, searching inside of large amount of historic relics in museums and in countryside. The work consists of personal visits with cameras, digitalisation, virtual reconstruction and usability testing in our lab.

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