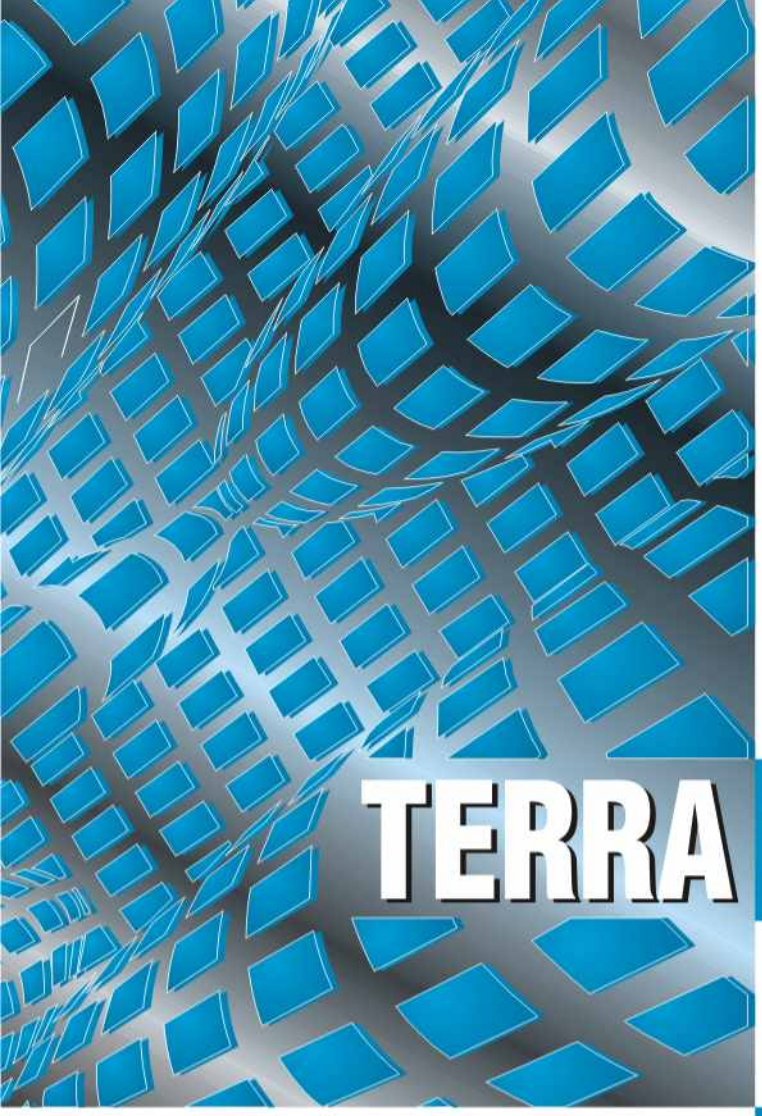

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FOREWORD

I am honored to present you the new issue of TERRA SPECTRA, which is devoted to the real estate market in an international context. Property market is characteristic with its heterogeneity and its effective functioning significantly affects the economy as a whole and creates conditions to exploit the potential and development of territory. It is a prerequisite and objective of interest of successful investment of development and financial companies. For example, last two years on the Slovak real estate market are characterized by significant increases in volumes of investments primarily in construction of shopping centers and office space, not only in Bratislava but also in smaller towns.

The real-estate market, its funding and relating activities are closely intertwined with the main focus of the magazine - the issue of spatial planning and territorial development. Only a few scientific journals in Slovakia currently deal with the issue of the real estate market. For this reason, one issue per year of the journal TERRA SPECTRA is devoted to the issue of the real estate market. Published contributions will focus on the current problems of the real estate sector, as well as other factors acting in this market, in a rapidly changing globalized world, thus contributing to a better understanding of this issue.

The global crisis has brought contingencies to the real estate market. Resulting from the turmoils in global markets also influenced the market of residential real estate of V4 countries. As an example is shown an analysis of the Hungarian residential market, which provides an interesting insight into developments in this area as well as clarification of certain determinants of this development. Part of the real estate market are also construction companies that during the financial crisis reported a large drop in productivity. Planning of many projects were halted, demand for project implementation was reduced which in turn affected the economy, especially medium and small (regional) construction companies. While most construction companies responded to the arising unfavorable economic situation by reducing its own staff and rationalization of production costs, some construction companies have sought to address the critical situation in time and actively, which is presented by the example of the company from the Czech Republic. Currently, the urgent issue is the problem with humidity in buildings, causing significant problems to both owners as well as tenants. In current issue of the journal TERRA SPECTRA we dedicated space for discussion about new scientific knowledge and results from this area.

Daniela Špirková
Guarantor of issue

Csilla Fülöpová

DEVELOPMENT OF REAL ESTATE PRICES IN HUNGARY

Introduction

The real estate market is part of the global market affected by substantial turbulences in recent years. Economic changes caused by the global financial and economic crisis also affected the real estate market of the V4 countries. Changes in GDP and inflation, further impact on the level of real estate prices.From the countries of V4, based on these factors, wefocused primarily on the Hungarian real estate market and we clarified some of the determinants of its development.

The V4 countries in relation to other European countries has high proportion of owned property by individuals, and from this perspective it is interesting to look at the evolution of real estate prices in these countries and compare them with the average of the Euro area EA19 and Eu28.

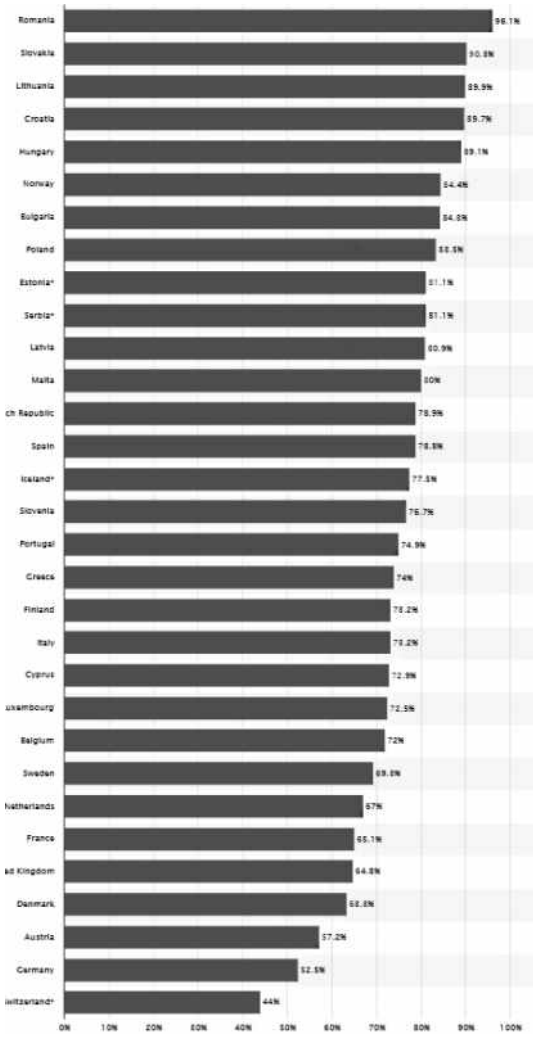

Figure 1: **Home ownership rate in selected European countries in 2014**

(Source: Statista, 2015)

GDP

Gross Domestic Product. The total market value of all final goods and services produced in a country in a given year, equal to total consumer, investment and government spending, plus the value of exports, minus the value of imports. (Investorwords, 2015)

The Euro area (EA19) includes Belgium, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland. The European Union (EU28) includes Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal Romania, Slovenia, Slovakia, Finland, Sweden and the United Kingdom. So from thecountries of V4 only Slovakia is part of the Euro area (EA19) and in the European Union (EU28) are represented all four V4 countries.

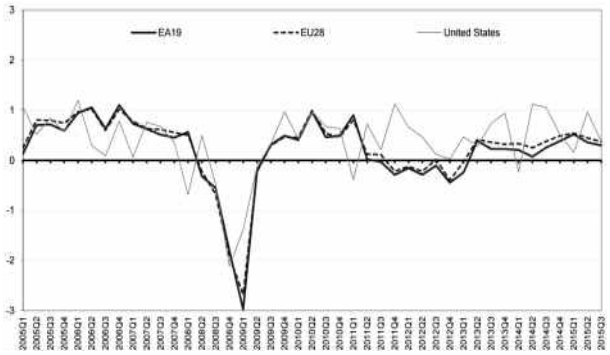

Figure 2: **EU28, euro area and United States GDP growth rates % change over the previous quarter**

(Source: Eurostat, 2015)

Seasonally adjusted GDP grew by 0.3% in the euro area (EA19) and by 0.4% in the EU28 during the third quarter of 2015 compared with the previous quarter, according to flash estimates published by Eurostat - the statistical office of the European Union. In the second quarter of 2015, GDP has been increased by 0.4%in both areas.

Compared to the same quarter of the previous year, seasonally adjusted GDP grew by 1.6% in the Euro area and 1.9% in the EU28 during the third quarter of 2015, after + 1.5% and 1.9% in the previous quarter.

In addition to these changes from year to year more lenient on the chart we can see a significant fall in GDP in 2008 and 2009, which was a result of the global financial and economic crisis.

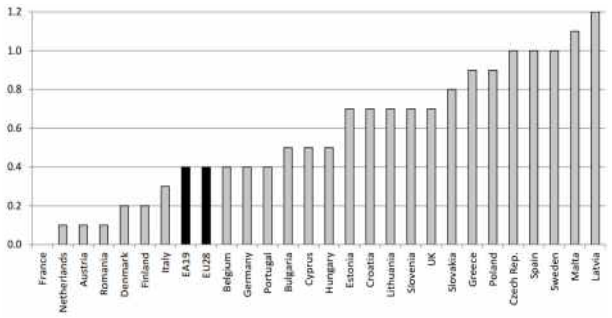

Figure 3: **GDP growth rates in the second quarter of 2015 % change over the previous quarter**

(Source: Eurostat, 2015)

The GDP has increased in all Member States,for which data for the second quarter of 2015are available, except in France, where it remained stable. The highest growth from the previous quarter was recorded in Latvia (+ 1.2%), Malta (+ 1.1%), followed by the Czech Republic (+ 1.0%) while in Poland (+ 0.9%), Slovakia (+ 0.8%) and Hungaryonly (+ 0.5%).

GDP IN THE V4 COUNTRIES

To get better information on GDP in the V4 countries and in Hungary, we can look at them compared to the EU28.

	2003	2004	2005	2006	2007	2008
EU28	100	100	100	100	100	100
EA19	109	108	108	108	108	108
Czech Republic	77	79	80	81	84	82
Hungary	62	62	62	62	61	63
Poland	48	49	50	50	53	55
Slovakia	55	57	60	63	67	71
	2009	2010	2011	2012	2013	2014
EU28	100	100	100	100	100	100
EA19	108	108	108	107	107	107
Czech Republic	83	81	83	82	82	84
Hungary	64	65	65	65	66	68
Poland	59	62	64	66	67	68
Slovakia	71	73	73	74	75	76

Table 1: **GDP per capita in PPS (Index EU28 = 100)**

(Source: Eurostat, 2015)

Based on these figures, we see that GDP per capita in PPS is in the V4 lower than the average of EU28 and in the Euro area is higher than in the EU. Although it lags behind the European average, it hasa growing trend from year to yearin individual V4 countries, approaching the EU28 average.

	Percentage change compared with the previous quarter				Percentage change compared with the same quarter of the previous year			
	2014	2015			2014	2015		
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
EA19	0.4	0.5	0.4	0.3	0.9	1.2	1.5	1.6
EU28	0.5	0.5	0.4	0.4	1.5	1.7	1.9	1.9
Czech Republic	0.5	2.5	1.1	0.5	1.3	4.1	4.6	4.3
Hungary	0.7	0.5	0.5	0.5	3.2	3.1	2.4	2.2
Poland	1.0	0.9	0.8	0.9	3.7	3.6	3.5	3.6
Slovakia	0.8	0.8	0.9	0.9	2.8	3.0	3.3	3.5

Table 2: **Growth rates of GDP in volume (based on seasonally adjusted data)**

(Source: Eurostat, 2015)

Inflation - HICP

Another of the determinants that affect the real estate market is the inflation.HICP - A list of the final costs paid by European consumers for the items in a basket of common goods. The Harmonized Index of Consumer Prices (HICP) is produced by each European Union member state to help measure inflation and to guide the European Central Bank in formulating monetary policy. The HICP is also used as the basis of the European Index of Consumer Prices, which is weighted toward household expenditures. (Investorwords, 2015)

	2003	2004	2005	2006	2007	2008
EU28	2.1	2.3	2.3	2.3	2.4	3.7
EA19	2.1	2.2	2.2	2.2	2.2	3.3
Czech Republic	-0.1	2.6	1.6	2.1	3.0	6.3
Hungary	4.7	6.8	3.5	4.0	7.9	6.0
Poland	0.7	3.6	2.2	1.3	2.6	4.2
Slovakia	8.4	7.5	2.8	4.3	1.9	3.9
	2009	2010	2011	2012	2013	2014
EU28	1.0	2.1	3.1	2.6	1.5	0.6
EA19	0.3	1.6	2.7	2.5	1.3	0.4
Czech Republic	0.6	1.2	2.1	3.5	1.4	0.4
Hungary	4.0	4.7	3.9	5.7	1.7	0.0
Poland	4.0	2.7	3.9	3.7	0.8	0.1
Slovakia	0.9	0.7	4.1	3.7	1.5	-0.1

Table 3: **HICP - inflation rate (Annual average rate of change %)**

(Source: Eurostat, 2015)

Demand - offer

For the demand and the supply, which together make up the real estate market there are many definitions, some of which are as follows:

Real estate market is a market in which all transactions associated with the transfer of ownership rights to land and buildings are carried out. (Špirková et al., 2009)

The real estate market is a place where all transactions associated with the transfer of ownership rights to land and buildingsare conducted. It connects demands for different types of real estate with their offer. (Špirková - lagomorphs, 2010)

The real estate market is a market in which they carry out all transactions associated with the transfer of ownership rights to land and buildings. The transfer of ownership can be temporary or permanent from one entity to another in exchange for a reward, usually monetary nature. The real estate market is not a separate market, but is an integral part of the global financial markets, what significantly facilitates the access to investment funds, but on the other hand,its a source of considerable risk. The real estate market is linked to the capital market and its characteristics (development of the money supply, credit availability) affects it. (Ivanička, et al., 2007)

The real estate market reflects the supply and demand for real estate in a particular country or region. The most important element of the market is the price of real estate and its development trend. This market consists of demand, supply for real estate, real estate prices, government intervention and intermediaries. (Goodman, 2011)

In the countries of V4 before the crisis there was high demand for real estate but also plenty of offers. Theoutbreakof real estate bubble resulted in problems at development companies and the accomplishment of already planned projects were in danger. All these factors have influenced the evolution of real estate prices.

FACTORS AFFECTING DEMAND AND SUPPLY OF HOUSING

The most important factors affecting the cost of housing is housing supply and demand. Demand for housing is determined predominantly by the following factors:

- the demographic changes in society,
- relationship between household income and expenditure on housing,
- certain inhabitationof a particular land is an important factor in demand for housing and also is a prerequisite for obtaining a loan guarantee,
- sources of funding and availability.
- taxes and subsidies which are closely linked and can induce demand for housing,
- interest rates. (Špirková et al., 2009)

Property prices

HPI - The index of real estate prices (HPI) measures the change in prices of all residential properties purchased by households (apartments, detached houses, townhouses, etc.), both newly built and existing, regardless of their final use and regardless of their previous owners. HPI of the Member States are compiled by national statistical offices. The HPI of the Eurozone and the whole EU is compiled by Eurostat.

Residential real estate prices, measured by the index of real estate prices increased by 1.1% in the Euro area and 2.3% in the EU in the second quarter of 2015 compared to the same quarter of the previous year. These figures come from Eurostat - the Statistical Office of the European Union. Compared with the first quarter of 2015, house prices grew by 1.2% in the Euro area and 1.3% in the EU in the second quarter of 2015.

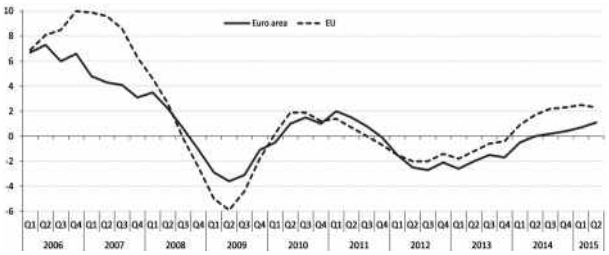

Figure 4: **House prices - annual rate of change for the euro area and the EU (%)**
(Source: Eurostat, 2015)

DEVELOPMENT OF PROPERTY PRICES IN THE V4 COUNTRIES

The global economic and financial crisis has greatly affected the real estate market and there was also a change in supply and demand. Before the crisis in the V4 the property market blossomed. After the bursting of the real estate "bubble" problems have occured in the construction and finalizing of the projects. Problems also manifestedat the development companies, which affected the planned projects. Even these facts had an impact on the price level of real estate.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EA19	:	8.1	9.6	2.6	-5.9	1.9	0.7	-2.0	-1.2	1.7	2.3
EU28	:	7.3	4.3	2.2	-3.6	1.0	1.5	-2.5	-2.0	0.0	1.1
Czech Republic	:	:	:	:	-4.4	-1.4	0.6	-2.0	0.1	1.8	3.5
Hungary	:	:	:	4.6	-5.2	-2.5	-3.4	-4.2	-2.3	2.8	11.9
Poland	:	:	:	:	:	:	0.6	-3.5	-5.2	1.8	1.1
Slovakia	:	:	25.4	28.6	-18.1	-1.6	-1.9	-2.5	1.2	1.2	5.6

Table 4: **House price index - annual rate of change for years 2005Q2-2015Q2**
(Source: Eurostat, 2015)

Among the Member States of EU, for which data are available, in Hungary has been one of the highest annual increase in house prices during the second quarter of 2015 (+11.9%).

Property prices in Hungary

Real estate prices in recent years have been considerably affected by the crisis, as the world as well as in the V4 countries, which includes Hungary. Hungary is part of the European Union (EU28), but unlike Slovakia,absent from the Eurozone (EA19). In Hungary, the valid currency is still Forint (HUF).

The year of 2015 was clearly a milestone on the real estate market in Hungary. After many years of decrease, this year has improved the situationon the market significantly. The real estate prices have increased, as well as the number of transactions in this area. Over the past six years, between 2008 and 2014 more than three hundred thousand transactionswere adjourned in the real estate business. Over the past year, it seems that the real estate market has recovered and the real estate prices have risen, which attracted buyers mainly with the intention to invest, but it is questionable whether it activates the interest of the masses of the population buying for own use.

Demand for apartments is growing, but mainly only meets the market's second hand dwellings. Offers for new constructionsare hard to find, with demand for them would be.

According to some forecasts, the number of transaction in the residential real estate market may climb up to the order of 150 thousand till the end of 2015. The appearance of those interested makes the possibility of agreeing on price to fall below 10% and the time of sale, in the case of panel and brick apartments shortened by one month. Compared with the same quarter of the previous year, apartment prices in the capital city grew by 20%. The market has not slowed down in recent months, and so far holdsthe tendencies of the first half.

Quarter year	Second hand dwellings			New dwellings		
	Compo-sition effect	pure price change	total price change	Compo-sition effect	pure price change	total price change
	2010 =100%					
2007 Q1	120.5	100.8	121.5	91.4	105.1	96.0
2008 Q1	97.8	107.3	105.0	94.9	107.1	101.6
2009 Q1	93.0	105.9	98.5	95.7	109.3	104.6
2010 Q1	106.8	101.2	108.0	102.6	100.2	102.8
2011 Q1	100.0	97.9	97.9	101.5	98.1	99.6
2012 Q1	105.0		101.0	99.5	97.1	96.6
2013 Q1	101.7	90.2	91.8	101.4	96.4	97.8
2014 Q1	103.7	91.0	94.4	98.8	99.5	98.3
2015 Q1	104.8	101.8	106.7	97.9	107.4	105.2
2015 Q2	93.9	104.8	98.4	93.6	105.9	99.1

Table 5: **Quarterly price indices (2007–2015)**
(Source: Eurostat, 2015)

AVERAGE HOUSING PRICES PER M^2

In 2014 the average price of newly built houses in Hungary was 960 euros / m2. It lags behind the Czech average (1,200 euros / m2) by 25% and 15% of the price of new housing in Poland (€ 1,100 / m2). The difference is that for buying a new apartment with an area of 70 m2 in the Czech Republic is required 7.1 annual gross average salary, in Poland it is 7.2 and 7.8 years in Hungary.

In general, the most expensive residential real estates are in central Hungary. In the third quarter of 2015 were the average prices of panel flats the most expensive per square meter in central Hungary - the equivalent of 697 euros / m2. In Western Transdanubia prices were the equivalent of 555 euros / m2for panels and the cheapest was buying apartments in Northern Hungary - on average the equivalent of 387 euros / m2.

THE DEVELOPMENT OF REAL ESTATE PRICES PER M2 IN HUNGARY AND BUDAPEST

In Budapest, the greatest demand is still for smaller,up to 50m2 apartments and therefore also the highest price increase is observable in this category of housing.This increased demand drives property prices upward, but the increasing level of prices sooner or later will affect retroactively on demand. It's a classic model that increasing of the prices leads to a decline in effective demand, which should soon lead to a smaller price correction. It is thought to be the case even at the end of 2015, but the extent when this occurs and how durable it will be, is hard to predict. The traditional end-year regression of demand is also expected in December of this year.

Region, settlement type	Second hand dwellings								
	2007	2008	2009	2010	2011	2012	2013	2014	2015. I–II.
Total	**574**	**519**	**497**	**516**	**497**	**484**	**468**	**497**	**552**
of which:									
Budapest	858	858	835	813	790	761	729	774	865
County seats	532	545	519	503	497	480	461	474	513
towns	435	439	413	426	410	390	377	387	403
villages	270	245	219	235	226	206	197	203	210
Region, settlement type	New dwellings								
	2007	2008	2009	2010	2011	2012	2013	2014	2015. I–II.
Total	**913**	**965**	**935**	**910**	**877**	**893**	**913**	**948**	**977**
of which:									
Budapest	1123	1168	1181	1132	1106	1113	1135	1148	1158
County seats	793	823	790	735	726	729	726	813	816
towns	819	826	794	748	716	719	735	794	900
villages	729	745	739	732	665	648	661	671	..

Table 6: **Mean price per sqm by region and settlement type (2007–2015) [EUR]**
(Source: Eurostat, 2015)

In recent years, the average price of residential properties wasusually highest in the capital, but also in western Hungary, mainly in Győr and Sopronthe prices of apartments have significantly increased. According to a survey, a comparison was made between 8,000 advertisements of apartments in October 2015 and data from the previous year in the same period. The prices in Sopron, located on the border of Hungary and Austria, have increased by 30-40%, while in Győr, this rise was more moderate.

In Győr and Sopron, the average house pricesin October 2015 were around 977 euros / m2. Specifically, in Sopron the prices of apartments with an area of 40-59 m2have increased by 36% to 1,184€/ m2. This price level is comparable with the prices of apartments in good condition offered in Budapest, where the average price in September 2015was 1245 € / m2. Number of factors are playing role in the rise of apartment prices in Sopron. Most importantlythe economic development of the region and particularly advantageous geographic position on the border with Austria, which offers more job opportunities and better salary for the employees than Hungary. All this leads to an increased demand of flats what causes increasing of their prices at the same time.

The prices of properties in Hungary have in the past year significantly increased in general, but if we take into accountthe inflation, they are still about one fifth lower than before the crisis. For this reason, according to an analysis of Duna House,the prices of apartments still could potentionally grow.

Conclusions

We have examined some selected determinants affecting the development of real estate prices. Fundamental factors such as GDP, inflation, as well as wages and interest rates in the country have an impact on the development of the real estate market. Interestingly, we compared some of them among the V4 countries and the European average. Finally, we have focused on a particular country - Hungary, where in addition to analysis of the development of prices for apartments, we also looked at demand and supply, which are also significantly influenced by the crisis. It affected in addition to economic and financial indicators, the mindset and mentality of the population and also the investors. Their reaction to the real estate market after the crisis has slowed down and havebeen recovered only in recent years. This trend of fall in property prices prevailed for several years until 2014, and positive changes have occurred onlyduring the last year.

Acknowledgment

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Richard Nagy

THE EVAPORATION DETERMINATION FROM WATER SURFACE

Introduction

The computational requests of air ventilation for dehumidification by means of mechanical ventilation with fresh air using an air handling unit without active dehumidification by direct cooling are presented in this article. The proposal and calculation counts mostly for the summer period, when are the increased demands on the amount of ventilation air. The reason is the high content of water vapor in outdoor fresh air and therefore reduced ability to absorb more water vapor from the interior air.

We can say that, while in summer the low relative humidity, and given the high temperature of the exterior air, this air is substantially saturated with water vapor. The present time brings new trends in applications such as swimming pool covered areas in family houses. An automatic part should be the design of the ventilation system or dehumidifying system for dehumidification and reduction of humidity. At the same time this reduces the risk of water vapor condensation on surfaces, molds creation and consequently minimizes the risk of various diseases and the spread of microorganisms (Vilceková, 2013, p.385) and (Kapalo, 2012, p.1) and (STN EN 15 251:2007).

Mechanical ventilation in moisture premises

The mechanical ventilation with fresh air is first way to reduce the amount of water vapor in wet applications. This ways is based on reducing of moisture without active dehumidification device (without condenser-evaporator unit). This is a reduction of relative humidity of indoor air by using a dryer exterior air.

The condensate which precipitates on the walls of structures severely damaging the structures runs down on window construction. Accompanying phenomenon is the emergence of such mold. Cladosporium, Penicillium, Aspergillus versicolor and it is unacceptable effect. Often not implemented internal vapor a barrier, moisture penetrates inside the structures condenses and worsens thermal-technical properties of structures.

Dehumidification by mechanical ventilation with fresh air

Input parameters of the requested relative humidity, air temperature, temperature of water surface are mentioned in Table 1 (STN EN 13 779) and (Hemzal, 1976) and (Chyský, 1977). Afterwards, the calculation of the required amount of fresh air was realised and the calculation of evaporation under specified border conditions. The results give a precise calculation procedure for determining the amount of fresh air that is necessary for the discharge (decrease) of water vapor produced by water surfaces.

Utilized mathematical formulas	
Description	**Value / Unit**
Input 1: Temperature of water volume	23 ~ 32°C
Input 2: Area of water surface	10 ~ 100 m²
Input 3: Air velocity above the water layer	0,2 m/s
Input 4: Indoor air temperature in space	25 ~ 32°C
Input 5: Wet bulb temperature – indoor space	25,43 ~ 20,22°C
Input 6: Indoor air humidity	60%
Input 7: Outdoor air temperature	32°C
Input 8: Wet bulb temperature – outdoor space	21,4°C
Input 9: Outdoor air humidity	40%
Input 10: Barometric pressure	98 800 Pa

Table 1: **The most standard input computational parameters**
(Source: Nagy, 2015)

Comparison

The results are shown in the following figures in division into computational models. The first computational model presents the results of fresh air and the intensity of evaporation from the water surface with a temperature difference ΔΘ=1˚C (difference between water and air). The calculations were carried out for air temperatures of 26 up to 32˚C and the water surface with an area of 10 up to 100m2. These results demonstrated the greatest moisture load into the space, thus the greatest intensity of evaporation and consequently the highest need of fresh air. The evaporation intensity difference at air temperature 26˚C and 32˚C is 7,0kg of water vapor per hour, which corresponds to about 25% of the difference at the water surface area 100 m2 (Figure 1).

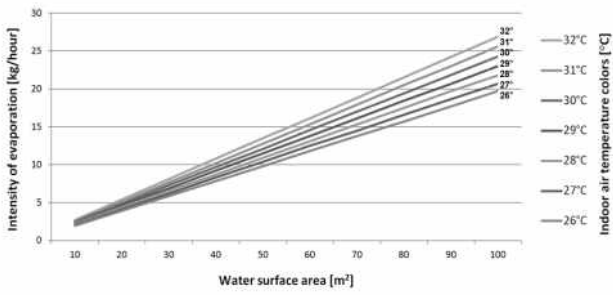

Figure 1: **Intensity of evaporation in dependence of water surface areas at difference indoor air temperature (ΔΘ=1˚C, difference between water and air).**
(Source: Nagy, 2015)

On the need for fresh air is to expose by difference up to 20 000 m3/hour, but in the opposite case, in that the absorption properties of hot air are significantly better than cooler indoor air. The comparison is shown in Figure 2.

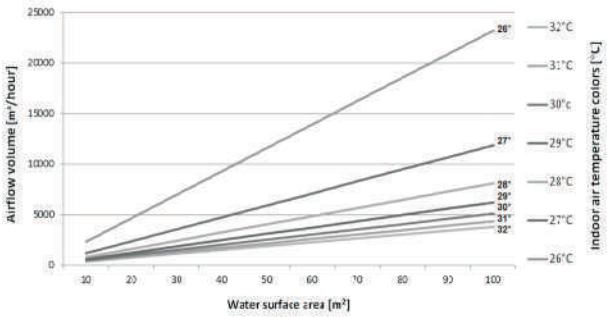

Figure 2: **Air flow volume of fresh air in dependence of water surface areas at difference indoor air temperature (ΔΘ=1˚C, difference between water and air).**

(Source: Nagy, 2015)

The second computational model presents the results of fresh air and the intensity of evaporation from the water surface with a temperature difference ΔΘ=2˚C (difference between water and air). The calculations were carried out for air temperatures of 26 up to 32˚C and the water surface with an area of 10 up to 100m2. These results demonstrated the greatest moisture load into the space, thus the greatest intensity of evaporation and consequently the highest need of fresh air. The evaporation intensity difference at air temperature 26˚C and 32˚C is 6,0kg of water vapor per hour, which corresponds to about 22% of the difference at the water surface area 100 m2 (Figure 3).

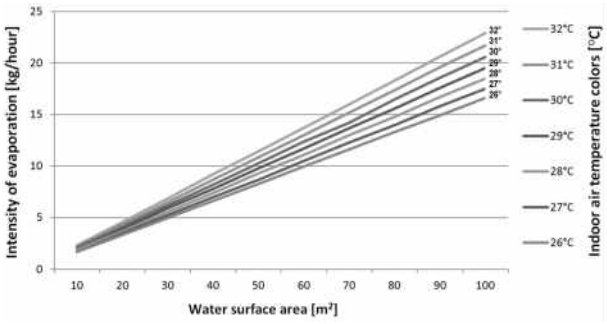

Figure 3: **Intensity of evaporation in dependence of water surface areas at difference indoor air temperature (ΔΘ=2˚C, difference between water and air).**

(Source: Nagy, 2015)

On the need for fresh air is to expose by difference up to 17 000 m3/hour, but in the opposite case, in that the absorption properties of hot air are significantly better than cooler indoor air. The comparison is shown in Figure 4.

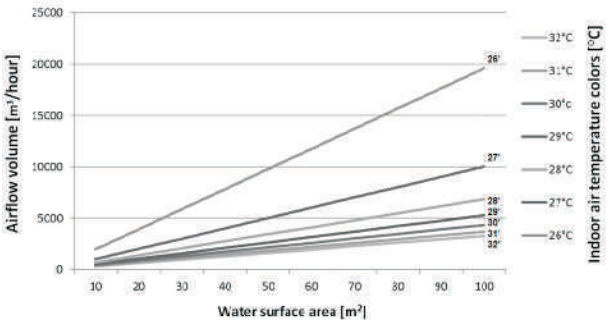

Figure 4: **Air flow volume of fresh air in dependence of water surface areas at difference indoor air temperature (ΔΘ=2˚C, difference between water and air).**

(Source: Nagy, 2015)

The third computational model presents the results of fresh air and the intensity of evaporation from the water surface with a temperature difference □□=3˚C (difference between water and air). The calculations were carried out for air temperatures of 26 up to 32˚C and the water surface with an area of 10 up to 100m2. These results demonstrated the greatest moisture load into the space, thus the greatest intensity of evaporation and consequently the highest need of fresh air. The evaporation intensity difference at air temperature 26˚C and 32˚C is 5,0kg of water vapor per hour, which corresponds to about 26% of the difference at the water surface area 100 m2 (Figure 5).

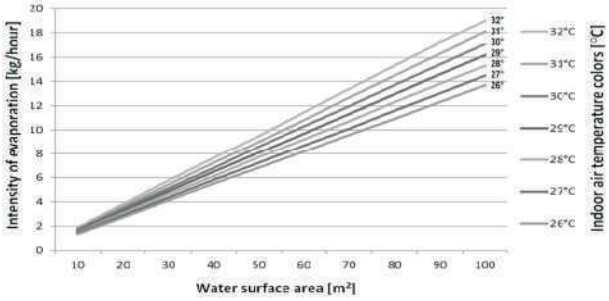

Figure 5: **Intensity of evaporation in dependence of water surface areas at difference indoor air temperature (ΔΘ=3˚C, difference between water and air).**

(Source: Nagy, 2015)

On the need for fresh air is to expose by difference up to 13 000 m3/hour, but in the opposite case, in that the absorption properties of hot air are significantly better than cooler indoor air. The comparison is shown in Figure 6.

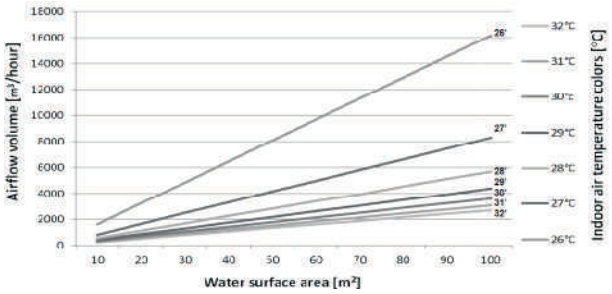

Figure 6: **Air flow volume of fresh air in dependence of water surface areas at difference indoor air temperature (ΔΘ=3˚C, difference between water and air).**

(Source: Nagy, 2015)

Results, Conclusions

From the all three cases was the third case evaluated as the most advantage, where the air temperature was 3˚C higher like water temperature. The amount of ventilation fresh air has achieved the value 16500 m3/hour. In comparing with first case in which the amount of ventilation fresh air has achieved the value 23000 m3/hour under the same boundary conditions and at the pool area 100m2. The distinction between fresh air is almost 6500 m3/hour. On the other side the maintenance of higher temperature results in excess of energy consumption. It reflected especially and mainly in winter season.

Of course the lower amount of fresh air is requested in winter season, because the specific humidity of fresh outdoor air is significantly lower. So the air is drier and ability to absorb of water vapor is considerably higher. This paper does not take into account the winter season and is not quantified.

The following Figure 7 presents the results of calculating the intensity of evaporation from water surface at internal air temperature between 26-32˚C. The results are illustrated by 3 curves. Dark blue curve line represents intensity of evaporation from water surface, which the indoor air temperature is at 1˚C higher as water temperature. The light blue curve line imagines the temperature difference 2˚C and red curve line temperature difference 3˚C. From figure is evident that with increasing of difference between indoor air temperature and water temperature (water temperature is higher) the intensity of evaporation is decreasing. At air temperature 32˚C is the difference between the intensity of evaporation ΔΘ=1˚C and ΔΘ=3˚C till 10kg/hour, which is approximately 30% reduction in evaporation from water surface.

It is very important to maintain higher temperature of air above water temperature also because healthy and hygienic reasons. The condensate which precipitates on the walls of structures severely damaging the structures runs down on window construction. Accompanying phenomenon is the emergence of such mold. Cladosporium, Penicillium, Aspergillus versicolor and it is unacceptable effect. Often not implemented internal vapor a barrier, moisture penetrates inside the structures condenses and worsens thermal-technical properties of structures. In other cases, they are installed only dehumidifiers condensing units. Their current range is inadequate and insufficient space is dehumidified. Condensing units do not work only with fresh air with recirculated air, so there are serious problems of water disinfection chemical vapors - chlorine, ozone, halogen, Y-bromo and chloroform (Kapalo, 2012, p.232).

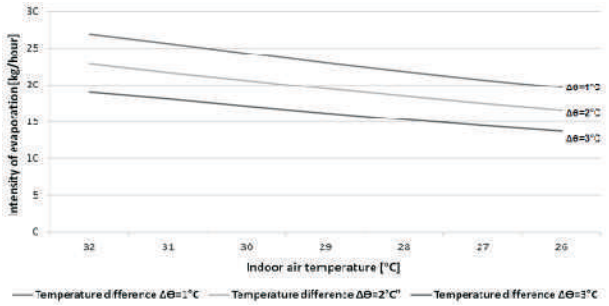

Figure 7: **Intensity of evaporation at different temperature differences**

(Source: Nagy, 2015)

Acknowledgements

Type and project number: KEGA 052TUKE-4/2013. Project title: Virtual laboratory utilizing in energy designing - efficient buildings.

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THE EXPERIENCE WITH GETTING OVER CRITICAL PHENOMENA IN THE BUILDING ENTERPRISE OF A REGIONAL SIGNIFICANCE

Introduction

This contribution is intent on the problems of an active access the building enterprise of a regional significance to a solution of a financial crisis. It goes out from the period of the end year 2008 when the Czech Republic was hit by the financial crisis whose the general phenomenon was that orders of building enterprise were capaciously and financially lower. While most of building enterprises reacted on the arisen national-economic situation by a reduction and a rationalization of their own employees and the expenses connected with a production which resulted in giving the sack to employees, in a conversion into contracting relationships and a restriction of expenses on machines, equipment if need Is on an inventory there was a certain amount of those on a market which did their best to solve a critical situation in time and actively. All these pieces of knowledge are practically applied to the examined building enterprise X1 s.r.o. which attempted at an active getting over the financial crisis by means of a view to the object of its activity (to the production of steel constructions) in which it excels in a region. Because in the period close to the beginning of the financial crisis and before it this building enterprise notice that there was an increased demand in the area of the production of steel constructions namely domestic and foreign it decided to realize a lately erected building of a productive hall for a production of steel constructions 20 x 45 m and reconstruction of productive areas of a locksmithery and a tinsmithery operations.

In the introductory chapters of the contribution the basic concepts connected with the solving problems are explained and the basic data about the building enterprise are described. The other chapters contain the tailed elaboration and evaluation of the realized investment namely on the basis of the calculation of the ratios of the economic efficiency (Net Present Value and Internal Rate of Return). The aim of the contribution is on the basic of the own experience to work out lucidly the problems of the active access of the building enterprise of a regional significance to a solution of the financial crisis and to judge the realized investment (the construction of the productive hall for a production of steel constructions and the reconstruction of productive areas of a locksmithery and tinsmithery operations) of the concrete building enterprise.

The terminology connected with the solving problems

- Investment Costs – represent a total of all costs of a capital character which is necessary for a construction of a production of a productive unit and for a security of its operation.
- Operating Costs – are a financial expression of a consumption of entrance factors; for investment calculations a generic division of costs into material, wage, deductional, the other and financial is used; on the basis of this division it is possible to find out on which entrance factor the biggest amount of financial means was exerted, which of costs has the biggest dynamism and can become a critical quantity during pessimistic variants of possible development of a project.
- Returns – their structure is given by a character of an evaluated project; particular sums if returns are assessed by a product of a projected volume of products in natural units and their expected unitary prices.
- Deductions – create a significant sum of costs which has no character of an expense; with regard to the fact that they don´t represent a decrease of financial means of a building enterprise it is possible to use them on a renewal of a long-termed property; a reimbursement of rise of claim, instalments of credits.
- Linear (Equable) Deducting – is the way of deducting of an investment property when deductions are equably divided into particular years of an investment function.
- Net Present Value – enables an evaluation of an economic efficiency in a longer time period; it goes out from the presumption that financial means are effectively invested only in case if the return from the investment is on a level with the initial investment cost or higher.
- Internal Rate Of Return – represent a percentage profitability of a project for the whole evaluated period.
- A Middle-termed Banking Credit – is an external source of financing of an investment with the maturity from 1 year to 5 years.
- A Long-termed Banking Credit – is an external source of financing of an investment with the maturity longer than 5 years.
- Instalments With a Constant Amortization – represent equable instalments of a credit whereupon it is necessary to calculate the interest from a credit´s remainder for every year; during an equable payment a height of the interest is the biggest in the first year, further the interest falls.

- Cash-flow for Judging of a Financial Stability of a project – their aim is to judge a financial stability or a commercial life – ability of a project which means to find out whether receipts generated by a project are sufficient for a reimbursement of all costs of a project including those associated with a foreign capital used for financing of a project.

The basic data about the examined building enterprise

- The title: X1 s.r.o.
- The law form: the corporation with a limited liability
- The object of the activity:
  - The production of steel construction of halls
  - The complete realization of building including complete repairs and reconstruction
  - Carpentry, slatery, locksmithery and tinsmithery
  - The construction of family houses, industrial halls and agricultural buildings.
- The regions of the activity: the region of Pardubice
- The year of the establishment:1992
- The management of enterprise: 2 managers
- The number of employees: 55

THE SIZE OF THE PRODUCTIVE UNIT AND THE DESCRIPTION OF THE TECHNOLOGY

Because the building enterprise X1 s.r.o. noticed that there was an increased demand in the area of the production of steel constructions in the period close to the beginning of the financial crisis, before it and during its course namely domestic and foreign it decided to solves this situation by the construction of the new hall. The future reasons which led to the realization of this investment were the following: the improvement the quality and the efficiency of the productive process, the improvement of working conditions, the extension of productive areas in conjunction with the location of particular machines, the property and the profitability of the production.

In the areas of the building enterprise 400 -500 tonnes of steel were worked before the construction of the hall; after the completion of the construction of the hall and its bringing into a full operation the capacity increased up to 720 -750 tonnes of steel which presents the annual increase of the productive capacity in about 73%. To this increase of the productive capacity the equipment of the productive hall by machines contributed as well (see Table 2: The costs on the machinery)

THE MATERIAL FEELS AND ENERGY

The building enterprise concludes the contracts of purchase on the deliveries of the decisive materials for the production of steel constructions. Electric power, water and gas are taken away from the already realized connections of the building enterprise.

THE LOCATION OF THE PRODUCTIVE UNIT

The productive unit representing the construction of the productive hall for the production of steel constructions is located in the contemporary area of the building enterprise X1 s.r.o. which is represented by its private pieces of land. The area of the building enterprise X1 s.r.o. is situated at the beginning of the newly set up industrial zone which enables an easy accessibility directly from the main road.

THE LABOUR FORCES (THE HUMAN FORCES)

The construction of the productive hall for the production of steel constructions was realized by the own employees of the building enterprise X1 s.r.o. (by its welders, painters, fitters of steel constructions) whereupon there was the increase in the amount of the employees which was represented by 5 workers. The increase was in the rows of the technical-economic employees as well which was represented by 1 master of the production and the control and 1 employee with the cumulated function of projector, a preparator and a technician.

The course of the project realization

The course of the project realization is stated in the following table.

The date of the starting/ The date of completion	The activity	The source of financing
01/2009 - 03/2009	the preinvestment phase	the middle-termed banking credit and the long-termed banking credit
04/2009 – 06//2009	the creation of the producing project documentation	the middle-termed banking credit and the long-termed banking credit
06/2009 – 07/2009	the building permission	the middle-termed banking credit and the long-termed banking credit
15.8.2009	the starting of the construction	the middle-termed banking credit and the long-termed banking credit
31.10.2009	the completion of the building part including communication	the middle-termed banking credit and the long-termed banking credit
1. 11. 2009 - 15. 11. 2009	the technological part of the construction, the equipment with machines	the middle-termed banking credit and the long-termed banking credit
15. 11. 2009 - 15. 12. 2009	the trial operation	the middle-termed banking credit and the long-termed banking credit
15. 12. 2009 – 13. 12.2009	the inspection of the hall and the locksmithery and tinsmithery operations before the starting of their full operation	the middle-termed banking credit and the long-termed banking credit
1.10	the starting of the production on its full operation	the middle-termed banking credit and the long-termed banking credit

Table 1: **The course of the project realization**
(Source: The plan of the realization of the project provided by the building enterprise X1 s.r.o., 2009)

The calculation of the investment costs

The investment costs include the costs on the machinery, the construction part and the other investment costs (see Table 2: The investment costs of the project in the year 0).

The item	The total [Czech crowns]
The costs on the machinery (the hydraulic presses, the hydraulic shear machine, the mobile frame scaffolding, the post rotary crane and so on)	6 848 492
The costs on the construction part (the reconstruction of the productive areas of the locksmithery and tinsmithery operations, the construction of the productive hall for the production of steel constructions)	5 400 000
The other investment costs (the containers for the metal waste, the packaging material from the paints and the other waste)	500 000
THE TOTAL INVESTMENT COSTS	12 748 492

Table 2: **The investment costs of the project in the year 0**
(Source: The accountancy by the building enterprise X1 s.r.o., 2009)

The calculation of the operating costs in the particular years of the project

The operating costs include the personal costs, the costs on the direct material, the costs on the short-termed material property (non-deducted) and the other operating costs (see Table 3: The operating costs of project in year 1)

The item	The total [Czech crowns]
The annual personal costs (the welders, the locksmiths, the painters, the master, the projector, the preparator and the technician, the manager, the operating and wage accounting department, the transport and working safety)	5 401 640
The insurance of health and the social insurance	1 890 574
The costs on the direct material (the steel profiles, the connecting material, the welding material, the grinding material, the cut material and the other material)	20 293 750
The short-termed material property (non-deducted) (the equipment of the office, the computer, software, the photocopier)	90 000
The other operating costs (the office needs, the propagation, the purchase of the tools, the transportation of people and the material, electric power, gas, water)	1 525 000
THE TOTAL OPERATING COSTS	29 200 964

Table 3: **The operating costs of project in year 1**
(Source: The accountancy by the building enterprise X1 s.r.o., 2009)

In further years there was the interannual increase of 6,8% in the personal costs, the interannual increase of 4,5% in the costs on the direct material, the increase of 5% in the costs on the short-termed material property in the fifty year (the copiousness of this property is considered in the first and the fifth year) and the interannual increase of 3% in the other operating costs.

The year	The personal costs [Czech crowns]	The insurance if health and social insurance [Czech crowns]	The costs on the direct material [Czech crowns]	The short-termed material property [Czech crowns]	The other operating costs [Czech crowns]	The total operating costs [Czech crowns]
1	5 401 640	1 890 574	20 293 750	90 000	1 525 000	29 200 964
2	5 768 952	2 019 133	21 206 969		1 570 750	30 565 804
3	6 161 241	2 156 434	22 161 283		1 617 873	32 096 831
4	6 580 205	2 303 072	23 158 541		1 666 409	33 708 227
5	7 027 659	2 459 681	24 200 675	94 500	1 716 401	35 498 916
6	7 505 540	2 626 939	25 289 705		1 767 893	37 190 077
7	8 015 917	2 805 571	26 427 742		1 820 930	39 070 160
8	8 560 999	2 996 350	27 616 990		1 875 558	41 049 897
9	9 143 147	3 200 101	28 859 755		1 931 825	43 134 828
10	9 764 881	3 471 708	30 158 444		1 989 780	45 330 813

Table 4: **The operating costs in the particular years of the project**
(Source: The accountancy by the building enterprise X1 s.r.o., 2009 - 2015)

The calculation of the returns in the particular years of the project

After the completion of the construction of the productive hall for the production of steel constructions and its building into a full operation 735 000 kgs of steel were worked in its area during the first year.

The calculation of the returns for the year 1 goes out from the following finding out; in further year there was the internnual increase of 4% in the returns.

Formula 1:

The returns fot the year 1: R = a weight (of steel) x prise (of steel)
(Source: Valach, J. 2006)
R = 735 000 kgs (of steel) x 47 Czech crowns/kg (of steel)
R = 34 545 000 Czech crowns – the first year

The year	1	2	3	4	5
The returns [Czech crowns]	34 545 000	35 926 800	37 363 872	38 858 427	40 412 764
The year	**6**	**7**	**8**	**9**	**10**
The returns [Czech crowns]	42 029 275	43 710 446	45 458 864	47 277 219	49 168 308

Table 5: **The returns in the particular years of the project**
(Source: The accountancy by the building enterprise X1 s.r.o., 2009 - 2015)

The calculation of Earnings after Taxes

The following table contains the calculation of Earnings Taxes (the rates are excluded from the informative source). As for as the deductions are concerned, these were calculated in case of the production hall and machines with which the hall is equipped; it was chosen a linear way of deducting (the particular deducting rates and the durations of deducting are excluded from the informative source.

The year	The returns	The operating costs	The deductions	The basic of Income Tax	Income tax	Earnings after Taxes
	[Czech crowns]	[Czech crowns]	[Czech crowns]	[Czech crowns]	[Czech crowns]	[Czech crowns]
1	34 545 000	29 200 964	923 535	4 420	884 100	3 536
2	35 926 800	30 565 804	1 892 491	3 468	659 016	2 809
3	37 363 872	32 096 831	1 892 491	3 374	641 165	2 733
4	38 858 427	33 708 227	1 892 491	3 257	618 965	2 638
5	40 412 764	35 498 916	1 892 491	3 021	574 058	2 447
6	42 029 275	37 190 077	146 200	4 692	891 670	3 801
7	43 710 446	39 070 160	146 200	4 494	853 876	3 640
8	45 458 864	41 049 897	146 200	4 262	809 926	3 452
9	47 277 219	43 134 828	146 200	3 996	759 276	3 236
10	49 168 308	45 330 813	146 200	3 691	701 346	2 989

Table 6: **The calculation of Earnings Taxes**
(Source: The accountancy by the building enterprise X1 s.r.o., 2009 - 2015)

The calculation of Cash-flow and Net Present Value

In the following table the values of Cash-flow and Net Present Value are calculated if we consider the rate of profitability at the height of 10% which was assessed by the investor.

The year	ngs after T	The deductions	CFi	1	DCFi	CFi cumulated
	zech crown	[Czech crowns]	[Czech crowns]	$(1+r)^n$	[Czech crowns]	[Czech crowns]
0			-12 748 492	1	-12 748 492	-12 748 492
1	3 536 401	923 535	4 459 936	0,9091	4 054 528	-8 693 964
2	2 809 489	1 892 491	4 701 980	0,8264	3 885 716	-4 808 248
3	2 733 385	1 892 491	4 625 876	0,7513	3 475 421	-1 332 827
4	2 638 744	1 892 491	4 531 235	0,683	3 094 834	1 762 006
5	2 447 299	1 892 491	4 339 790	0,6209	2 694 576	4 456 582
6	3 801 328	146 200	3 947 528	0,5645	2 228 380	6 684 961
7	3 640 210	146 200	3 786 410	0,5132	1 943 186	8 628 147
8	3 452 841	146 200	3 599 041	0,4665	1 678 953	10 307 100
9	3 326 915	146 200	3 383 115	0,4241	1 434 779	11 741 879
10	2 989 949	146 200	3 136 149	0,3855	1 208 985	**12 950 864**

Table 7: **The calculation of Cash-flow and Net Present Value (r = 10%)**
(Source: Valach, J. 2006)

From the table stated above it ensue that Net Present Value NPV was negative provided the assessed rate of profitability at the height of 10% in the years 0-3 of a project´s life; in the year 4 of the project´s life its value converted into positive and gradually increased up to the value 12 950 864 Czech crowns which was reached in the year 10. On the basis of the deciding rule for the ratio of Net Present Value which accepts all investments with a positive or a zero Net present Value and Refuses all those which have Net Present Value negative it is possible to state that the project is effective provided the assessed rate of profitability at height of 10%.

The calculation of Internal Rate of Return

Because for the calculation of Internal Rate of Return it is necessary to assess the positive and the negative value of Net Present Value the negative value of Net Present Value was calculated (it was reached provided r = 33%)

The year	Earnings after Taxes	The deductions	CFi	1	DCFi	CFi cumulated
	[Czech crowns]	[Czech crowns]	[Czech crowns]	$(1+r)^n$	[Czech crowns]	[Czech crowns]
0			-12 748 492	1	-12 748 492	-12 748 492
1	3 536 401	923 535	4 459 936	0,7519	3 353 426	-9 395 066
2	2 809 489	1 892 491	4 701 980	0,5653	2 658 029	-6 737 037
3	2 733 385	1 892 491	4 625 876	0,4251	1 966 460	-4 770 577
4	2 638 744	1 892 491	4 531 235	0,3196	1 448 183	-3 322 394
5	2 447 299	1 892 491	4 339 790	0,2403	1 042 852	-2 279 543
6	3 801 328	146 200	3 947 528	0,1807	713 318	-1 566 224
7	3 640 210	146 200	3 786 410	0,1358	514 194	-1 052 030
8	3 452 841	146 200	3 599 041	0,1021	367 462	-684 568
9	3 326 915	146 200	3 383 115	0,0768	259 823	-424 745
10	2 989 949	146 200	3 136 149	0,0577	180 956	**-243 789**

Table 8: **The calculation of Net Present Value provided (r = 33 %)**
(Source: Valach, J. 2006).

Formula 2:
Internal Rate of Return 1:
IRR = r1+ (NPV+/ (INPV+I+INPV- I)) x (r2 –r1)
(Source: Korytárova, J., Fridrich, J. Puchýř, B.,2002)
IRR = r1+ (NPV+/ (INPV+I+INPV- I)) x (r2 –r1) = 10 + (12 950 864/ (12950 864 +143 789)) x (33-10) = **32,5750%**

From the calculation of Internal Rate of Return stated above and the deciding rule for this ratio on the basis of which the projects which have IRR higher or equal to the Internal Rate of Return assessed in advance it is possible to come to a conclusion that the project is effective because Internal Rate of Return acquired by the calculation (IRR = 32,5750) is higher than the rate of return assessed beforehand (r = 10%)

Cash-flow for the judging of the financial stability of the project the long-termed and the middle-termed banking credit

THE SCHEME OF THE INSTALMENTS OF THE LONG-TERMED INVESTMENT CREDIT WITH THE CONSTANT AMORTIZATION

This is the long –termed banking credit

- The height of the credit: 12 748 492 Czech crowns
- The maturity of the credit: 5 years
- The interest rate: 10%
- The régime of the payment: the annual instalments with the constant amortization
- The starting of the credit usage:1.1 2009 (the year 0)
- The starting of the credit payment:1.1 2010 (the year 1)

The year	The state of the debt [Czech crowns]	The amortization [Czech crowns]	The interest [Czech crowns]
1	12 748 492	2 549	1 274
2	10 198 794	2 549	1 019 87
3	7 649 096	2 549	764 910
4	5 099 398	2 549	509 940
5	2 549 700	2 549	254 970
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0

Table 9: **The scheme of the instalments of the long-termed banking credit**
(Source: Korytárova, J., Fridrich, J. Puchýř, B.,2002)

Formula 3:
The calculation of the instalment (the amortization): U = D/n
(Source: Korytárova, J., Fridrich, J. Puchýř, B.,2002)
U = D/n = 12 784 492/5 = 2 549 698 Czech crowns

Formula 4:
The calculation of the credit interest: u = Dn x r
(Source: Korytárova, J., Fridrich, J. Puchýř, B.,2002)
u = Dn x r = 12 748 492 x 0,1 = 1 274 849 Czech crowns

THE SCHEME OF THE INSTALMENTS OF THE MIDDLE-TERMED INVESTMENT CREDIT WITH THE CONSTANT AMORTIZATION

This is the middle – termed banking credit

- The height of the credit: 2 000 000 Czech crowns
- The maturity of the credit: 3 years
- The interest rate: 10%
- The régime of the payment: the annual instalments with the constant amortization (instalment)
- The starting of the credit usage:1.1 2010 (the year 1)
- The starting of the credit payment:1.1 2011 (the year 2)

The year	The state of the debt [Czech crowns]	The amortization [Czech crowns]	The interest [Czech crowns]
1	0	0	0
2	2 000 000	666 667	200 000
3	1 333 333	666 667	133 333
4	666 666	666 666	66 666
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0

Table 10: **The scheme of the instalments of the middle-termed banking credit**
(Source: Korytárova, J., Fridrich, J. Puchýř, B.,2002)

Formula 5:
The calculation of the instalment (the amortization): U = D/n
(Source: Korytárova, J., Fridrich, J. Puchýř, B.,2002)
U = D/n = 2000 000/3 = 666 667 Czech crowns

Formula 6:
The calculation of the credit interest: u = Dn x r
(Source: Korytárova, J., Fridrich, J. Puchýř, B.,2002)
u = Dn x r = 12 000 000 x 0,1 = 200 000 Czech crowns

CASH-FLOW FOR THE JUDGING OF THE FINANCIAL STABILITY OF THE PROJECT – THE LONG-TERMED AND THE MIDDLE-TERMED BANKING CREDIT

The table 11 provides the survey about Cash-flow of the project whose source of financing were the long-termed banking credit and the middle-termed banking credit.

The year	0	1	2	3	4	5
THE RECEIPTS						
The source of financing: the long-termed banking credit	12 748 492					
The source of financing: the middle-termed banking credit		1 055 757	944 243			
The returns		34 545 000	35 926 800	37 363 872	38 857 427	40 412 764
The total receipts	12 748 492	35 600 757	36 871 043	37 363 872	38 857 427	40 412 764
The year	**0**	**1**	**2**	**3**	**4**	**5**
EXPENSES						
The addition of the investment property	-12 748 492					
The addition of the stocks		1 691 146	76 102	79 526	83 104	86 845
The costs without the deductions and the interest		29 200 964	30 565 804	32 096 831	33 708 227	35 498 916
The interest		1 274 849	1 219 879	898 243	576 606	254 970
The instalments of the credits		2 549 698	3 216 365	3 216 365	3 216 365	2 549 698
The Income Tax		884 100	659 016	641 165	618 965	574 058
The total expenses	-12 748 492	35 600 757	35 737 166	36 932 130	38 203 267	38 964 487
The net Cash-flow			1 133 877	431 742	654 160	1 448 277
The money at the beginning of the year				1 133 877	1 565 619	2 219 779
The money at the end of the year			1 133 877	1 565 619	2 219 779	3 668 056

Table 11: **Cash-flow for the judging of the financial stability of the project 1-5 year**
(Source:Valach, J.,2009)

The year	6	7	8	9	10
THE RECEIPTS					
The source of financing: the long-termed banking credit					
The source of financing: the middle-termed banking credit					
The Returns	42 029 275	43 710 446	45 458 864	47 277 219	49 168 308
The total receipts	42 029 275	43 710 446	45 458 864	47 277 219	49 168 308
The year	**6**	**7**	**8**	**9**	**10**
EXPENSES					
The addition of the investment property					
The addition of the stocks	90 753	94 836	99 104	103 564	108 224
The costs without the deductions and the interest	37 190 077	39 070 160	41 049 897	43 134 828	45 330 813
The interest					
The instalments of the credits					
The Income Tax	891 670	853 876	809 926	759 276	701 346
The total expenses	38 172 500	40 018 872	41 958 927	43 997 668	46 140 383
The net Cash-flow	3 856 775	3 691 574	3 499 397	3 279 551	3 027 925
The money at the beginning of the year	3 668 065	7 524 831	11 216 405	14 716 342	17 995 893
The money at the end of the year	7 524 831	11 216 405	14 716 342	17 995 893	21 023 818

Table 12: **Cash-flow for the judging of the financial stability of the project 6-10 year**
(Source:Valach, J.,2009)

The evaluation: By means of the middle-termed credit the enterprise is able to reimburse all its costs in the year 1; the receipts exceed the expenses in all years of the project´s life so that the net Cash-flow is positive in the particular years. It is possible to consider the given project sufficiently financially stable and the judged variant of financing acceptable. At the same time it stands to reason from Cash-flow that the annual postponement of the instalments of the middle-termed banking credit is necessary because the payment from the first year of the operation isn't possible.

Conclusions

The examined building enterprise X1 with the law form of the corporation with a limited liability proceeded to an active solution of a financial crisis in this way that it aimed at to object of its activity (the production of steel constructions) in which it excels in a region. Because the enterprise was financially healthy and its management looked after the future working capacity of the enterprise (the orders) it used the investment into the development of the enterprise as the defence against a financial crisis. In the contribution the economic efficiency of the realized investment was evaluated which the realization of the construction of the hall for the production of the steel constructions and the reconstruction of the productive areas of the locksmithery and linsmithery operations represented.

In the theoretical part of the contribution the basic concept connected with the solving problems were clarified which are investment cost, operating costs, returns, deductions, linear (equable) deducting, Net Present Value, Internal Rate of Return, a middle-termed banking credit, a long-termed banking credit, instalments with a constant amortization, Cash-flow for judging of a financial stability of a project. In the first chapter of the practical part the basic data about the building enterprise which the construction of the hall for the production of the steel constructions and the reconstruction of the productive areas of the locksmithery and tinsmithery operations realized were described. In the further chapters of the practical part the realized investment is elaborated and evaluated in detail on the basis of the calculation of the ratios of economic efficiency (Net Present Value and Internal Rate of Return).

On the basis of the pieces of knowledge from the theoretical part and the outcome from the practical part it is possible to state that the project is effective (provided the profitability rate at the height of 10% Net Present Value was positive and Internal Rate of Return acquired by the calculation was bigger than the rate of return assessed in advance). It stands to reason from Cash-flows that the receipts in all years of the project. It is then demonstrated that the project creates sufficient financial means for the payment of the interest and the instalments of the credits. It is possible to consider the given project sufficiently financially stable and the judged variant of financing acceptable. At the same time it stands to reason from Cash-flows that the annual postponement of the middle-termed banking credit is necessary because the payment from the first year of the operation isn't possible.

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SUSTAINABILITY IN HERITAGE PROTECTED AREAS

SUSTAINABILITY IN HERITAGE PROTECTED AREAS

Edited by: Laura Verdelli in cooperation with Derek Martin and Izabela Mironowicz
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The book „Sustainability in Heritage Protected Areas" combines the work produced by all the participants of the European Urban Summer School (EUSS). This is a new annual event of the Association of European Schools of Planning (AESOP) that has been launched in 2010 for young planning practitioners and academics across Europe to promote an exchange of ideas and foster a debate on contemporary planning issues amongst representatives of the new generation of planning professionals.

The present book contains the proceedings of the fifth EUSS which took place in Tours, France from 1st-8th September 2014 organised by the Ecole Polytechnique de l´Université de Tours, Département Aménagement et Environment. The theme was „Heritage conservation and sustainable urban development". The central question proposed for the book is: identify contradictions between heritage conservation and sustainability among recent urban developments, analyse decision-making process and expose a physical or process-related response. Several students´ products have been collected (from master thesis and master internships up to undergraduate reports). Different case studies have been focused on possible approaches and types of answers to this question (the stakes of cultural landscapes along water, the possible application of heritage and sustainable development concerns in India, the structure of soft regeneration culture-led projects in Spain) and provided various material (e.g. from an interview with a local architect often dealing with heritage, so as to add a professional witness to the official institutional point of view and complete the panel of „expertise" represented. The theoretical approaches also differ, from mostly descriptive to very critical overviews. Most of the texts are in English but a few in French, nevertheless headed by an English abstract.

The book is worth to read as it is a relevant contribution how to sustain cultural identity as the only thing that differentiates one people from the other in a globalized world.

Dagmar Petríková

Filip Gulan

KIC INNOENERGY PHD. SCHOOL

CE SPECTRA – Centre of Excellence of the Institute of Management of the Slovak University of Technology is pleased to become the first research institute in Slovakia to establish cooperation with KIC InnoEnergy network of European leading industries, universities, research centres and business schools, located in eight different countries.

The mission of KIC InnoEnergy PhD School is unique in a way that it aims to foster an innovative and entrepreneurial culture in its graduates putting emphasis on linking the doctoral candidate's research with its active potential within the energy industry. Moreover, KIC network enables to build a European network that links research and education in the field of sustainable energy with both the technical needs of the industry and with society at large. This perspective is very attractive for interdisciplinary environment at CE Spectra and particularly in connection to spatial planning practice since energy and spatial planning has been traditionally treated as two separate domains. The mainstream framing of sustainable energy development often proves to be rather limited, what in turn underplays the multifunctional role of sustainable energy and its potential synergy-effects, e.g. between the phenomena of renewable energy development and sustainable local and regional development. These issues are addressed in the dissertation research of our PhD. candidate Filip Gulan that has been accepted for the KIC InnoEnergy PhD. School in July 2015. CE Spectra is eager to support him in the PhD. School and thus allow added value to his dissertation.

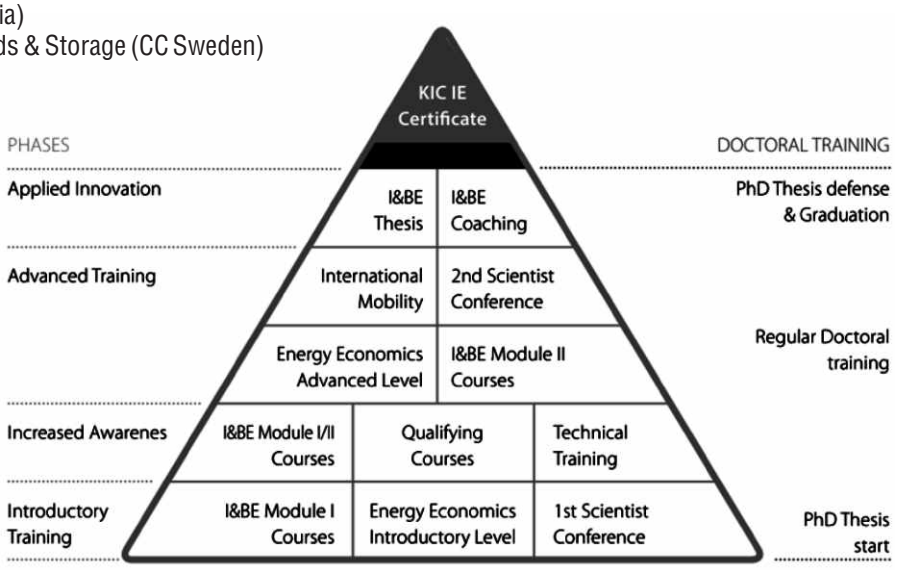
The educational and training programme of the PhD. School is organised into six thematic tracks, each directed by one of KIC InnoEnergy's six co-location centres:

- Smart Cities and Efficient Buildings (CC Benelux)
- Convergence Nuclear-Renewables (CC France)
- Energy from Chemical Fuels (CC Germany)
- Renewables (CC Iberia)
- Clean Coal Technologies (CC Poland; coordinator for Slovakia)
- Smart Grids & Storage (CC Sweden)

One of the major objectives of KIC InnoEnergy PhD. School is to provide customized and comprehensive training in innovation and entrepreneurship in the field of sustainable energy. On this basis, six different modules have been defined to fulfil the rigorous requirements of the PhD. School training programme in addition to training and research of a candidate's PhD. studies at the home university, as you can see below.

The introductory course of Energy Economics (3 ECTS; based in Grenoble Ecole de Management), for example, presents the ongoing energy revolution by discussing how energy markets are evolving. This course aims to provide better understanding of the deep transformation that the energy sector is going through, explaining its roots and discussing the challenges that are resulting from it. Central notions discussed during the course are illustrated with company visits and testimonials from guest speakers and energy experts coming directly from the "industry". Through this approach, participants are encouraged to apply the concepts and business practices studied in the light of their own experiences.

In addition to the training, the opportunity to enjoy a new network of contacts is indispensable for PhD candidates in the field of sustainable energy since the energy sector dynamics in the real world are framing the practical importance of the academic work of students and can catalyse its applicability. One of the largest benefits for PhD. students engaged in this innovative network is that all expenses arising from KIC activities, including 4-12 months long mobility at a foreign university or international company, are supported and covered by KIC InnoEnergy PhD. School. Both CE Spectra and Institute of Management of Slovak University of Technology look forward to the further collaboration of our students with this open-minded network and are keen to encourage more students to participate in similar programmes and projects.



Martina Lazarová

reSITE CONFERENCE 2015

Resource: reSITE conference, 2015

On 18 -19th June 2015, PhD Students of Spatial planning participated in the reSITE urban festival in Prague that held for the fourth time, under the name "The Shared City". The idea of shared city was discussed not only by the leaders of architecture, urban design and urban planning, but also technological and social innovation startups, municipal activists and politicians.

The reSITE brought together global thought leaders to debate the merits and shortfalls of the share, efficient and equitable city. Together with them, PhD student of spatial planning debated how design and policy can be used to create shared values and define how to improve the quality of life in the city. Moreover, the conference reached beyond the "shared space" and ideas of the city as depicted in books of Jan Gnarr (former mayor of Reykjavik), and covered a much broader spectrum of issues – from shared economy to the urban planner's new role. Speakers focused on the social dimension of the urban fabric.

Resource: Turzová, 2015

For whom is the city built and who actually creates it? Participatory planning and crowdsourcing, as a means of presenting different possibilities to each other seem to form a dominant vision on the way towards a sustainable future of Prague and other growing cities in Europe and around the world. James Corner, the creator of the High Line and a landscape architect, argued that commercialization of the communal space should be balanced. But Michael Sorkin showed that this is no longer necessarily. The common spaces not only don't have to offer commercial potential, but even should not – because this negates their inclusive nature. The rhetoric of economic growth has already lost its rationale. Another perspective about sharing water as common pool resource brought to the discussion Henk Ovink, principal of Rebuild by Design and Special and the first Special Envoy for International Water Affairs for the Kingdom of the Netherlands.

To sum it up, reSITE conference was interested in bridging the gaps between design, policy, finance and community participation in order to build a more equitable, livable, competitive and resilient city. Simply put, to build „The Shared City".

Mária Turzová

LANDSCAPE IN FLUX: PARTICIPATION IN ECLAS CONFERENCE 2015

Fig. 1 - Group picture of participants before conference dinner, Source: ECLAS conference 2015
First day of the ECLAS conference, Doctoral colloquium for doctoral candidates was organized, where participating PhD. students presented their dissertation and they got valuable feedback from experts and lecturers, for example Simon Bell, Amber Roberts, Diedrich Bruns, Davorin Gazvoda. Doctoral colloquium included also the lectures and discussions; helpful for gaining new approaches and perspectives to the research and its progress. Next two days, the conference consisted of the lectures of keynote speakers – Marco Casagrande, Catharine Ward Thompson, Bob Bunce and Katrin Paadam, also from four parallel sessions of full oral presentations, Pecha Kucha presentations, round tables and poster session, covering a wide range of topics concerning landscape architecture, planning, teaching and research. The conference was officially terminated by common conference dinner and awards ceremony in a castle in the east rural part of Estonia.

Our world is changing faster and greater nowadays; and the landscape is facing constant pressure and change. Complexity and also chaos are the order of the day, when the flux of change and its direction is often unpredictable. People, as the responsible for transformations in all aspects and dimensions of landscape, seek to regulate these changes, considering them as something negative. But landscape is so complex, that the "gardening" of it is not usually possible.

Fig. 2 – **Participating round table**,
Source: ECLAS conference 2015

Fig. 3 – Place for the conference dinner,
Source: Turzová Mária, 2015

Then, our deeper understanding of landscape in the context of change, sharing the knowledge from research and studies and mutual learning among experts from all around the world; that are the significant steps to deal with change. ECLAS conference 2015 - the European Council of Landscape Architecture Schools - was also dealing with this issue, with the conference theme Landscape in Flux.

Conference took place from 20th September to the 23rd September 2015 at the Department of Landscape Architecture in the Estonian University of Life Sciences in Tartu. Tartu, as the academic and cultural Centre of Estonia, has been facing the huge changes and transformations during previous history very markedly.

The Institute of Management STU participated in this premier landscape education and research event in Europe, as the doctoral student of Spatial Planning program was honored to be part of the conference with own research "How to Sustain Urban Green Spaces: Case study Devínska Kobyla" (Turzová, 2015).

Milan Husár

PHD STUDY STAY AT DRESDEN LEIBNIZ GRADUATE SCHOOL (DLGS)

Thanks to long-term cooperation between SPECTRA Centre of Excellence at Slovak University of Technology in Bratislava and Dresden Leibniz Graduate School (DLGS) at Dresden University of Technology I had the privilege to spend 6 months at DLGS as an associate member. The stay was supported by Erasmus+ grant scheme which allows students to focus on their studies by helping them with funding their research. The aim of this short article is to share experience from this stay about Erasmus+ mobility for PhD students and to make a critical reflection on the differences between doing doctoral degree at Slovak and at German institute in order to draw some lessons for Slovak side on how to improve the quality of education process and opening up gates to academia to perspective young researchers.

DLGS is a unique project established for doctoral candidates. It offers doctoral fellowships for students with Master Degree and strives for promoting excellent research and focuses on current challenges in spatial development. More information can be found on website of graduate school (http://www.dlgs-dresden.de/) in both German and English language. Candidates from any country in the world are eligible for the program which is reflected in multicultural and multilingual environment, while the official working language is English. In March 2016, 6th cohort of doctoral candidates began their studies.

Topics of research are diverse, but usually candidates are roofed under some general theme. In the first years the topic was demographic change, last few candidate cohorts focused of the theory and practical implications of resilience and currently the school begins focusing on Sustainable, resilient and inclusive cities and regions, reflecting the research agenda on European level (Europe 2020 strategy, striving for smart, sustainable and inclusive economy). Each doctoral candidate applies with his own unique project, while it should reflect the main topics in order to find overlaps among the candidates and use synergic effects of their work to conduct excellent research. The selection process of candidates and their projects is highly competitive, usually three candidates out of more than a hundred of applicants are selected after several rounds of research proposal evaluations and distance and face-to-face interviews.

Program lasts usually three years and is highly demanding on the candidates. A lot of focus is put on regular evaluation of research projects. These occur in general twice every year, first round takes place in the autumn in form of Autumn School and the second one at the end of the year in form of so-called gremium. I had the opportunity to take part in both of these happenings in 2015.

The first event took place at the end of September 2015. The Autumn School is a unique opportunity for all members of DLGS and IOER (Leibniz Institute of Ecological Urban and Regional Development, partner institutions) to meet and present themselves, their research agendas and the progress they had made in last few months. DLGS candidates are asked to submit their research proposals and for more advanced candidates also their preliminary results to several internal and external reviewers. All members are asked to present their work which is followed by discussion and question and answer session. The objective for new DLGS candidates is to introduce themselves to larger academic audience and first hand feedback from fellow academics. It all takes place in critical, but friendly environment and for many students it is one of the first presentations of their work to wider professional audience.

Gremium is more closed and more critical event. The students are asked to present their progress and next steps in their research to his or her supervisors. Just like in autumn school, students submit their work to supervisors. The presentation is followed by deep discussion about the status of the research and if it is possible to finish it within the timeframe of the program. Gremium is crucial part of the DLGS program as on the one hand, it makes students work hard to convince the committee that they are capable to finish the project and deliver high quality results and on the other hand, it helps revealing gaps in the projects and provides constructive ideas for the research.

One of the biggest differences between Slovak doctoral programs and DLGS is that DLGS candidates have the opportunity to focus fully on their research. They are usually not a part of teaching process and work exclusively on their projects. Nevertheless, it is rather a double-edged sword. The idea is excellent, to give candidates time and resources (facilities and access to academic staff and their supervisors), however for some people it can lead to slow burn-out and isolation. To prevent it and to support academic growth, the study plans include several one or two day courses focused mostly on methodology and presentation skills. In these courses also other PhD candidates from Dresden University of Technology so they get in touch with their peers.

What can we learn from DLGS? There are both positives and negatives there, it is hard to say everything is better or everything is worse. DLGS candidates have more time to work on their projects, but at the same time the requirements on them are much closely watched. Their supervision is rather closer, but it is not because the professors there have more time for them, but because the system requires multiple screenings of students' work during their studies. This is one of the things which can be taken from this experience, to give students more opportunities to present their work and their progress to institute staff and network more with more advanced colleagues.

Hereby I would like to express my gratitude both to my home institution and to DLGS for their encouragement and the way I was welcome. The second day after I arrived I took part in the Autumn School and I presented my research proposal and it gave me the opportunity to introduce myself, my work and my institution. During my whole stay I took part in several courses they offer for PhD candidates, but more importantly I was allowed to work in peace on my project for a few months. Being in the second year of my PhD studies, I very welcomed this possibility to have time to put ideas together and I progressed a lot in my dissertation. I have had many opportunities to discuss my work with academic staff and their comments improved my work and strengthened the arguments I provided.

Lastly, here I would like to encourage PhD students to take up an opportunity to go on Erasmus+ study stay abroad during their studies. You can work on your dissertation and focus on writing as you are not obliged to attend courses and bring ECTS which takes away a lot of stress.

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Next Issue:
The Next issue will be devoted
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