

# FUTURE

*of the Visegrad Group*



Lesław A. Paga  
Foundation



Visegrad Fund



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## FOREWORD



**Wojciech Przybylski**

Editor-in-chief  
of Eurozine & Visegrad Insight  
Chairman of Res Publica Foundation

2016 marks a quarter of a century in a pro-Western trajectory of four Visegrad countries. The group, formally established on February 15th, has had two basic goals. One was to join NATO to increase security and independence from Moscow. The second was to join the common European (Western) project for prosperity and security of our societies. Both goals seemed to have been fulfilled in 2004.

The Visegrad countries have been co-coordinating their diplomatic efforts to facilitate the withdrawal of the Red Army from their territories, finally accomplished in 1993 - at first, before the formal establishment of the cooperation. Then, parallel efforts to meet harsh criteria of accession were made. One may argue which of those processes have been more transformative. There is no doubt, however, the economy and infrastructure would not be developed without the process of EU enlargement, if not an unprecedented effort by Central European societies to reform, rebuild, and modernize that has been met by support comparable only to the Marshall Plan funds for Germany launched in 1948.

One may compare the process of change to a train trip. The departure station has been somewhere in the east, the next station was in the west, but currently the destination is unknown. We had to speed up the train and set up its tracks to get to where we are. Once set in motion, the train is still on the move. The growing ambitions and appetites reinforce and push the European project further, with its economic, infrastructural, and political potential. Today, the New Europe does not mean solely that much of a political struggle for independence in geopolitical terms, but more a search for new engines of growth and development. The Visegrad Group is exploring this direction and seeks to improve its own, hence European competitiveness. Under the EU strategy, the V4 countries seek development through innovation, healthy fiscal policies, and bettering energy and transportation infrastructure. Often, those efforts are blurred and overshadowed by current political developments. But by any means, they are not supposed to be disregarded. They are one of cornerstones to secure the fundamental accomplishments of those last 25 years.

Therefore, it must be stressed this report explores the key areas of future cooperation. It is an explorative and informative reading, prepared by the future leaders, who at an early stage of their careers, demonstrate how a visionary approach may meet excellent analytical skills. If one wondered about the future after 25 years of cooperation, one finds many answers in this report. It is a must read for all interested in prospects of the European project from the Central European perspective.

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# ACKNOWLEDGMENTS

This publication originates from a sincere concern about the region's future. Being proud of the region's development over the last 25 years we were looking for ways to influence its development in future. Seeking for like-minded supporters, we have found exceptional people, who supported us in our endeavours of creating this report.

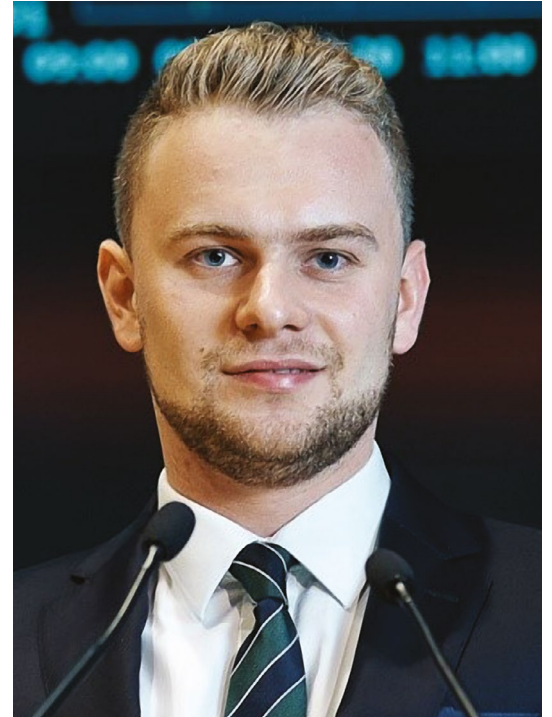
First of all, we would like to recognize the invaluable contribution of the Lesław A. Paga Foundation, which daily inspires us to thrive for the best in our professional and personal lives. The Foundation has constantly supported us throughout all stages of the project – from finding an appropriate team to enabling us to contribute to the public debate with our findings. This report would not be possible without the Lesław A. Paga Foundation.

We wish to thank Global Shapers Warsaw Hub, which supported us with providing us with an exceptional network of brilliant minds. We hope that the ongoing feedback on our ideas helped the report to become visionary and practical at the same time. We highly appreciate the support of all the reviewers engaged from across the region, who generously invested their time and ideas in our initiative. We would like to thank you in detail at the end of our report. We wish to acknowledge the support provided by our partners Aspen Institute Prague, Republikon Institute from Hungary, Res Publica from Poland and the International Visegrad Fund, which funds this publication. We are looking forward to further initiatives to facilitate the collaboration of Visegrad.

Finally, we give our sincerest thanks to the whole team of V4 Future: Joanna Rycerz, Petra Kaciakova, Damian Szewczyk, Sebastian Wieczorek, Zsombor Incze, Tomasz Nisztuk, Ondřej Dvouletý, Dominik Keil and Piotr Krzemiński. The debates from across the region proved not always to be easy, but worthwhile!

Sincerely Yours,

**Damian Polok and Paweł Michalski**  
Project Leaders V4 Future



Damian Polok



Paweł Michalski



# ABOUT THE LESŁAW A. PAGA FOUNDATION

Since 2003, the Lesław A. Paga Foundation has enabled young leaders to excel their potentials by actively contributing to the shape of the region's future. The foundation aims at creating a network of highly ambitious students and young professionals, who not only seek to advance in their professional lives, but also want to make an impact in their immediate environment and society. Our educational projects cover the fields of:

- Capital markets (Capital Market Leaders Academy, CEE Capital Market Leaders Forum),
- Energetics (Academy of Energy; New Energy Forum),
- Healthcare (Healthcare Leaders),
- Technology and innovations (Young Innovators, Innovation Day)
- Media (Academy of Analysis and Media)

The Alumni of the Foundation are given unique chances to learn from the best experts and gain practical experience in over 70 partner companies. There are about 500 Alumni, who support each other not only professionally, but also on the private ground.

It is also our mission to promote the highest ethical standards and culture among entrepreneurs. This is why, every year, we grant the Lesław A. Paga award to businessmen, activists, and institutions. This honorary distinction constitutes a commemoration of our Patron's work. In previous years, the winners were: Krzysztof Lis, Leszek Czarnecki, Leszek Balcerowicz, Igor Chalupiec, Joseph Wancer, Janusz Lewandowski, prof. Grzegorz Domański, Zygmunt Solorz-Żak, prof. Marek Belka, Jacek Siwicki, and Hebert Wirth.

Our vision of promoting the highest ethical standards is not limited to professionals and students. We give secondary school students the opportunity to participate in the Stock Market Game (SIGG), and those who finish their secondary education can apply for the Indeks Start2Star Scholarship, awarded during the whole period of studies.

Apart from our regular projects, we organize conferences, workshops, and lectures, whose speakers are the best specialists of the Polish and European markets.



**Lesław A. Paga**  
**Foundation**

## CEE Capital Market Leaders Forum

In 2014, the Lesław A. Paga Foundation organized, with the Warsaw Stock Exchange as the strategic partner, the first edition of international CEE Capital Market Leaders Forum. We are proud of organizing the first event for bringing together and growing new generations of capital market leaders.

The main idea of the event is to establish a communication platform for regional peers, which enables young leaders to experience and participate in professional workshops that combine theoretical knowledge with capital market practice. The Forum intends to create a framework to create lifetime networks, aimed at developing future international collaboration in the center of Europe.

## Lesław A. Paga (24.09.1954 – 02.07.2003)

Lesław A. Paga was one of the forefathers of the capital market in Poland. As an expert in macroeconomics, ownership transformation, and capital market sector, he co-created the Polish Securities Trading Act, the Act on Bonds, and other securities trading acts of law. He specialized in managing enterprises, strategy, and restructuring. He conducted projects related to an enterprise strategic assessment, managing by values, investors' relations, and investigations concerning financial crimes.

Lesław A. Paga was respected by entrepreneurs and all political wings. After 1989, he was advisor to various prime ministers. Faced with corruption scandals in Poland and other countries, he fought for corporate governance, transparency, invitations to tender, and any business activity. He was a tough negotiator, devoted to his mission. Notwithstanding difficulties, he always examined problems holistically.

Lesław A. Paga was a versatile person - having graduated from science studies, he also took interest in the humanistic field. He was fascinated with classical music, contemporary literature, and theatre. He enjoyed directing. Lesław A. Paga was a creative man, whose enthusiasm and positive attitude towards life motivated other people.



**FUTURE**

*of the Visegrad Group*

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# INTRODUCTION INTO THE PROJECT

*[We, the young] should develop our vision, we should have a view that in a sense a prescientific of what the game is about, about the way the beast functions, about the way the various parts of economics and social science are related and, yes, about our own maps of Utopia. Once we have a vision, then our control of theory, our command of institutional detail, and our knowledge of history are to be marshalled to support the vision.*

*- Hyman P. Minsky*

The Visegrad Group celebrates its 25th anniversary. The 1991 meeting in the city of Visegrad, old capital of Hungary, provided for a link to a meeting held almost 7 centuries ago at the same place. In 1335, the Visegrad Castle hosted King of Bohemia John of Luxembourg, King of Poland Casimir II, and King of Hungary Charles I of Anjou. The first Visegrad meeting tried to establish closer relationship and cooperation among the three kings and their states. The aim of both were the same – to guarantee peace and facilitate cooperation.

In both cases, the members of the Group agreed on many things they had in common. In the 90s, the former communist countries, with historical enmity often resulting in open struggles, saw a possibility to join forces, once again, to jumpstart their European integration process. And so, on 15th February 1991, at a meeting of the President of the Czechoslovak Republic Václav Havel, the President of the Republic of Poland Lech Wałęsa, and the Prime Minister of the Republic of Hungary József Antall, the Visegrad Group was established. With the dissolution of Czechoslovakia, in 1993, into two independent countries -the Czech Republic and the Slovak Republic, the Group grew into four members. From that time, the Group is commonly referred to as the Visegrad Four or V4.

Before the establishment of the International Visegrad Fund, in 1999, there were no common agendas, nor regular meetings and discussion among the Group Members, except for NATO and European Union enlargement talks. Then, in 2002, the Expert Working Group on Energy commenced its works. After the V4 countries joined the European Union on May 1st 2004, the regional cooperation precipitated. In 2011, the Group formed the Visegrad battlegroup to serve as an EU Battlegroup in 2016 and in 2019. Some successful trade and diplomatic initiatives happened along the way. And so, the 25 years passed.

The fathers of V4 created foundations and new forms of political, economic, and cultural cooperation in the altered Central Europe. They strived to achieve full restitution of state independence, democracy, and freedom after decades of a totalitarian system. And they, we succeeded on many fronts. But these achievements are merely a stepping stone. New challenges lie ahead of us, and we need to aim high, once again. Especially in terms of economic cooperation, there is a lot to be done to reveal the full potential of the V4 countries. In our mid-20s, we are the V4 offspring, and it is our generation that will shape the next 25 years of the Group. We feel responsible for our countries, and that is why we decided to speak up about the future in which we would like to live.

Just as the regional rulers in the XIVth century and democratic presidents in the 1990s, we were looking for ways to join forces and face the upcoming challenges. That is why we prepared recommendations for the next steps to be taken to improve V4 cooperation. Although our ideas are often supported by numerical data, our aim was to be visionary, therefore, more qualitative than quantitative. We hope for this report to start a serious discussion about the future and a true dialogue between generations. In the months following the publication of this report, we plan to build on this idea. We hope to mobilize experts, industry specialists, business leaders, and public officials to help us prepare detailed plans to achieve our goals.

*Dear Reader, we wish you an inspiring lecture. And for you, dear Visegrad Group, we wish all the best for the 25th birthday. Let the next 25 be even better!*

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# INTRODUCTION INTO THE REPORT

*"Know from whence you came. If you know whence you came, there are absolutely no limitations to where you can go."*

*- James Baldwin*

To shape the future, it is necessary to analyse the past. Therefore, before exploring our potential, we gathered a wide range of information on our economic development over the last 25 years. This data is not exhaustive, but will give our readers a rough picture of what the V4 countries have accomplished so far.





The following chapters present our vision on the V4 economic development in the fields of entrepreneurship, finance, energy, and infrastructure. We also prepared a short case discussion on the matter of adopting EURO as a common currency in all Visegrad countries. We hope, in the months and years to come, we can build upon our recommendations and actively participate in the ongoing transformation of our economies.

# 1. VISEGRAD GROUP ECONOMIES UNVAILED

Ondřej Dvouletý

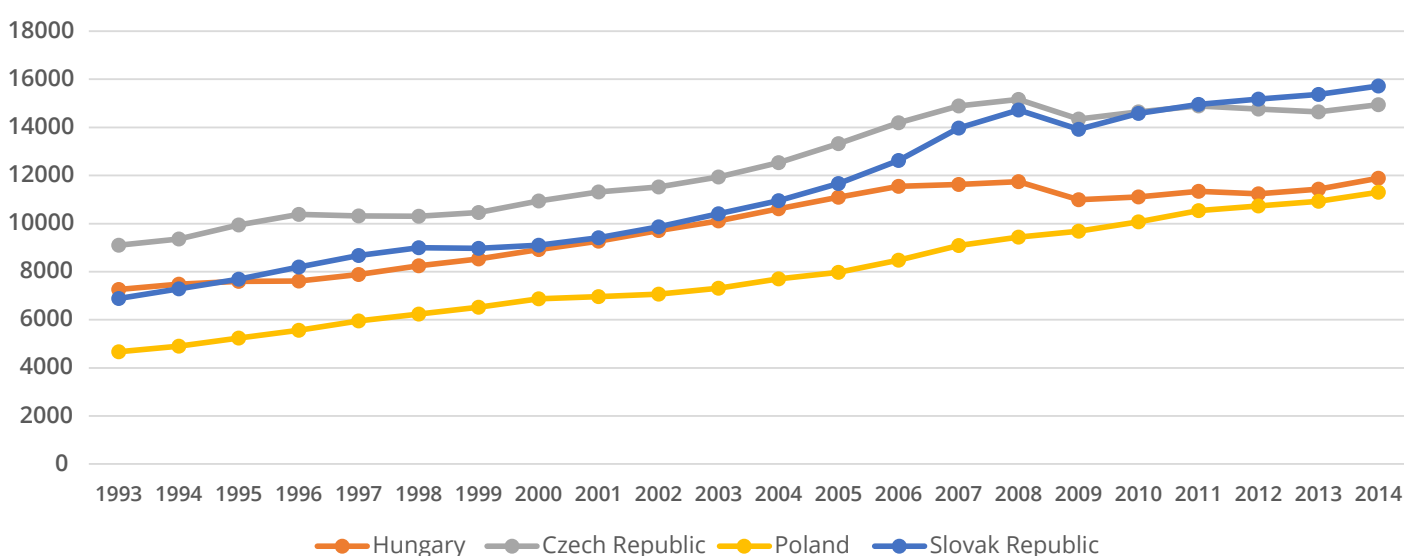
Over the last 25 years, the V4 countries grew significantly and became **richer in economic terms** (Table 1). This can be observed in the development of the life expectancy rates and the GDP per capita (Figure 1). After the fall of communism, the Visegrad Group member states **integrated their economies into international trade**, which contributed to the countries' GDP. The rising number of people obtaining tertiary education indicate the **ongoing transformation into knowledge-based economies**.

Table 1: General statistics of V4 countries

Country	Czech Republic		Slovakia		Poland		Hungary	
Indicator								
Population in 2014	10 510 566		5 418 506		37 995 529		9 861 673	
Surface area (sq. km, 2014)	78 870		49 036		312 680		93 030	
Average GDP growth for years 1993-2014 (%)	2,4		4,0		4,2		2,0	
Year	1993	2014	1993	2014	1993	2014	1993	2014
GDP per capita (constant 2005 US\$)	9 095	14 945	6 884	15 727	4 665	11 305	7 255	11 888
Unemployment rate (%)	4,3	6,1	12,2	13,2	14,0	9,0	12,1	7,7
Merchandise trade (% of GDP)	71,9	158,6	71,6	168,9	36,4	79,3	53,7	157,0
Year	1993	2013	1993	2013	1993	2013	1993	2013
Life expectancy at birth (years)	72,8	78,3	72,4	76,3	71,6	76,8	69,1	75,3
Year	1995	2013	1993	2013	1993	2013	1993	2013
Health expenditure, total (% of GDP)	6,7	7,2	6,1	8,2	5,5	6,7	7,3	8,0
Year	1998	2013	1993	2013	1993	2013	1993	2013
Population with tertiary education as a share of population 15-64 (%)	8,5	19,1	8,1	18,1	8,5	23,8	10,6	20,2

Source: World Bank and Eurostat (2015)

Figure 1: GDP per capita in constant prices (2005)







Source: World Bank and Eurostat (2015)

## 1.1 Competitiveness

To compare the V4 economies, we used several indices, including political stability, competitiveness, innovativeness, and law enforcement rankings (Table 2). Surprisingly, the Czech Republic, Slovakia, and Hungary worsened their world positions, measured by Global Competitiveness, with **Poland being the only country among the 4 to improve its position slightly**. The **biggest problems** of V4 economies were identified in public sector related areas, specifically, in **tax regulations** and **bureaucracy** (World Economic Forum).

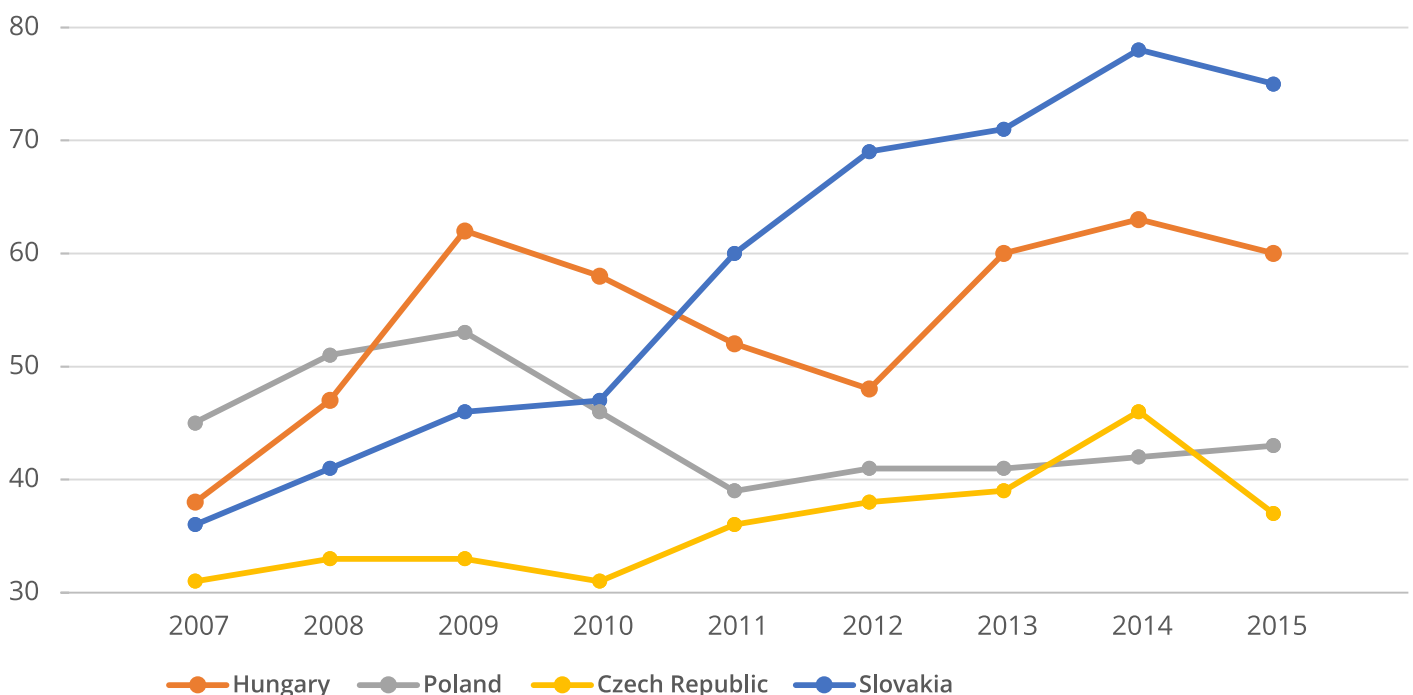
Table 2: Selected indicators representing competitiveness of V4 countries

Country	Czech Republic		Slovakia		Poland		Hungary	
Indicator								
Year	2006-2007	2014-2015	2006-2007	2014-2015	2006-2007	2014-2015	2006-2007	2014-2015
Global Competitiveness Index	4,7	4,5	4,5	4,1	4,4	4,5	4,3	4,5
Global Competitiveness Index Rank	31	37	36	75	45	43	38	60
Year	1995	2015	1995	2015	1995	2015	1995	2015
Economic Freedom Index	67,8	72,5	60,4	67,2	50,7	68,6	55,2	66,8
Year	1998	2014	1998	2014	1998	2014	1998	2014
Corruption Perceptions Index	4,8	5,1	3,9	5,0	4,6	6,1	5,0	5,4
Year	1995	2012	1995	2012	1995	2012	1995	2012
Knowledge Economy Index	7,8	8,1	7,2	7,6	6,9	7,4	7,5	8,0
Year	1996	2014	1996	2014	1996	2014	1996	2014
National Patent Office Applications per thousand of population 15-64	0,7	0,2	0,7	0,1	0,2	0,2	0,4	0,1

Source: Heritage Foundation, Transparency International, World Bank, World Economic Forum (2015)

**Corruption** remains a problem. Looking at the data from the Corruption Perceptions Index, it is fair to conclude that a small step was made, but it is not enough to catch up with the global leaders in law enforcement and public sector efficiency (Transparency International).

Figure 2: Global Competitiveness Index rankings over years 2006-2015







Source: Heritage Foundation, Transparency International, World Bank, World Economic Forum (2015)

The overall **competitive environment seems to be improving**. The Index of Economic Freedom reflects rapid improvements in business, labour market, and trade freedom. Following the World Economic Forum’s recommendations, the V4 countries should **improve their infrastructure**, develop **better higher education** and training organizations, and **promote development of financial market and innovative behaviours**<sup>1</sup>.

Apart from the already mentioned corruption, the most problematic factors (as reported by the World Economic Forum) include **red tape, tax regulation**, and **rates**, and **restrictive labor regulations** (Table 3).

Table 3: The most problematic factors for doing business

Czech Republic		Slovakia		Poland		Hungary	
							
Inefficient government bureaucracy	<b>18,6</b>	Inefficient government bureaucracy	<b>17</b>	Tax regulations	<b>23,2</b>	Policy instability	<b>15,1</b>
Corruption	<b>16,3</b>	Corruption	<b>16</b>	Restrictive labor regulations	<b>15,5</b>	Access to financing	<b>13,5</b>
Policy instability	<b>9,1</b>	Restrictive labor regulations	<b>15</b>	Inefficient government bureaucracy	<b>14,6</b>	Corruption	<b>13</b>
Restrictive labor regulations	<b>9</b>	Tax rates	<b>10</b>	Tax Rates	<b>11,2</b>	Tax regulations	<b>11</b>
Tax regulations	<b>8</b>	Tax regulations	<b>10</b>	Access to financing	<b>9,6</b>	Inefficient government bureaucracy	<b>10,3</b>
Inadequately educated workforce	<b>6,3</b>	Inadequate supply of infrastructure	<b>9,3</b>	Inadequate supply of infrastructure	<b>5,6</b>	Tax Rates	<b>10,1</b>
Tax Rates	<b>6,2</b>	Policy instability	<b>7,7</b>	Insufficient capacity to innovate	<b>4,3</b>	Inadequately educated workforce	<b>6,9</b>
Insufficient capacity to innovate	<b>5,9</b>	Inadequately educated workforce	<b>6,3</b>	Corruption	<b>3,4</b>	Poor work ethic in national labor force	<b>5,8</b>
Access to financing	<b>5,8</b>	Access to financing	<b>2,8</b>	Policy instability	<b>3,3</b>	Insufficient capacity to innovate	<b>4,3</b>
Poor work ethic in national labor force	<b>3,9</b>	Poor work ethic in national labor force	<b>2</b>	Inadequately educated workforce	<b>2,7</b>	Inadequate supply of infrastructure	<b>3</b>

Source: World Economic Forum

As we will argue in the following chapters, these factors, with **lacking infrastructure** and **inadequately educated** workforce, pose serious threats to our ability to become truly innovative economies and hence, may undermine our competitive position in the future.

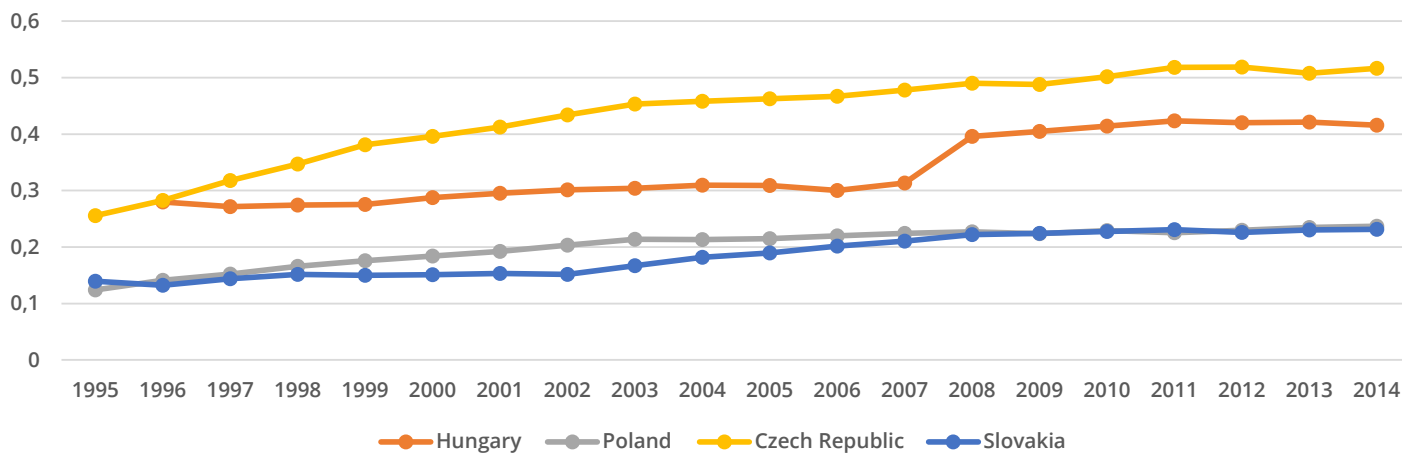
<sup>1</sup> The number of patent applications dropped significantly in the V4 region after the EU accession, but rebounded after the establishment of the European patent office (according to the EUROSTAT data available).



## 1.2 Entrepreneurial activity

In order to capture the development of the regional business activity over time, we calculated the rate of registered business entities per economically active population<sup>2</sup>. From the figure below, we may see that business activity grew significantly in all V4 countries (Figure 3).





Figure 3: Registered Entities per population 15-64 during years 1996-2014



Source: Central Statistical Office of Poland, Czech Statistical Office, Hungarian Central Statistical Office, Slovak Statistical Office, World Bank

Time required to start a business is another important indicator of entrepreneurial environment and is treated as an indirect measure of bureaucracy. During the last 20 years, all V4 countries were able to **decrease the number of days required to establish a business by over 100%**. The **costs of starting-up a business venture declined**, and regulatory norms concerning minimum paid-in capital required to start-up a business venture were relaxed. Law enforcement remains a challenge, with costs related therewith remaining at 1996 levels, and in Slovakia's case, increasing over the years (World Bank).





Table 4: Selected indicators representing entrepreneurial environment in V4 countries

Country	Czech Republic		Slovakia		Poland		Hungary	
Indicator								
Year	1996	2014	1996	2014	1996	2014	1996	2014
Registered Enterprises per population 15-64	0,3	0,5	0,1	0,2	0,1	0,2	0,3	0,4
Year	2003	2015	2003	2015	2003	2015	2003	2015
Time required to start a business (days)	40	15	103	12	56	30	52	5
Year	2005	2015	2005	2015	2005	2015	2005	2015
Minimum paid-in capital required to start a business (% of income per capita)	39	0	41	19	220	11	80	48
Cost to start a business (% of income per capita)	10	7	5	2	20	12	22	7
Cost to enforce a contract (% of claim)	33	33	26	30	19	19	15	15

Source: Central Statistical Office of Poland, Czech Statistical Office, Hungarian Central Statistical Office, Slovak Statistical Office, World Bank

<sup>2</sup> Considering all limitations coming from registered subjects, which may not always be active in economy.

Table 5: Enterprises in V4 countries in 2014 according to size, employees and value added

Country	Czech Republic		Slovakia		Poland		Hungary	
Indicator								
Number of micro enterprises/proportion	968 998	96,1%	375 780	95,8%	1 407 427	95,2%	497 947	94,5%
Number of small enterprises/proportion	31 850	3,2%	13 810	3,5%	52 676	3,6%	23 906	4,5%
Number of medium-sized enterprises/proportion	6 273	0,6%	2 213	0,6%	14 850	1,0%	4 064	0,8%
Number of SMEs/proportion	1 007 121	99,9%	391 803	99,9%	1 474 953	99,8%	525 917	99,8%
Number of large enterprises/proportion	1 406	0,1%	465	0,1%	2 940	0,2%	829	0,2%
Number of employees/proportion micro	1 132 769	32,1%	537 760	37,6%	3 007 504	36,5%	867 316	35,7%
Number of employees/proportion small	637 865	18,1%	263 387	18,4%	1 121 510	13,6%	447 932	18,4%
Number of employees/proportion medium-sized	645 056	18,6%	230 254	16,1%	1 550 098	18,8%	404 374	16,7%
Number of employees/proportion SMEs	2 424 690	68,8%	1 031 401	72,2%	5 679 112	68,8%	1 719 622	70,6%
Number of employees/proportion large	1 100 327	31,2%	397 534	27,8%	2 570 479	31,2%	708 457	29,2%
Value added billion euros/proportion micro	16	19,8%	10	29,8%	28	14,7%	9	18,5%
Value added billion euros/proportion small	12	14,5%	7	19,1%	27	14,4%	8	16,2%
Value added billion euros/proportion medium-sized	16	19,9%	6	15,8%	39	20,9%	9	19,2%
Value added billion euros/proportion SMEs	45	54,1%	23	64,6%	94	50,0%	25	53,9%
Value added billion euros/proportion large	38	45,9%	12	35,4%	94	50,0%	21	46,1%

Source: Eurostat

Of all business entities, small and medium enterprises (SMEs) are perceived as the backbone of the economy. According to the European Commission, they represent about 99% of all businesses in the EU.<sup>3</sup> The SMEs handle about 67% of total EU private sector employment and add over 58% value on an EU-average. These characteristics are similar in Visegrad Group, regarding all but one indicator. Except for Slovakia, the value added by SMEs is below the European average in the V4 countries.

### 1.3 Innovativeness






We chose several indicators to paint the picture of innovativeness in our economies. The highlighted information in Table 6 points to three main layers of innovative behaviour: the so-called **enablers** (light red) capture the main drivers of innovation performance external to the firm, the **firm activities** (light blue) capture the innovation efforts at the level of the firm, while the **outputs** (light green) capture the effects of firms' innovation activities.

According to the European Innovation Scoreboard's methodology, the V4 countries were described as **moderate innovators**. The innovation performance improved in our countries over the last 7 years, despite some fluctuations (especially for Poland, where the performance fell for 2012 and 2013 and rebounded in 2014). Most of the Visegrad Group countries are performing below the EU average for all dimensions. Poland is, particularly, weak, regarding the number of non-EU doctorate students and public-private co-publications. Hungary shares this characteristic. It also struggles to maintain the sales shares of new innovation and the number of SMEs with product or process innovations. Slovakia is relatively weak in license and patent revenues generated abroad (this indicator is down by 38%), and the non-R&D innovation expenditures are steadily declining. Czech Republic's weaknesses are its research systems and intellectual assets; however, performance has improved in these areas by 7.9% and 6.2%, respectively. A more pressing issue is a 30% decrease in venture capital investments, which might cause widening of the financing gap for innovative enterprises. Human resources are a relative strength, especially in regards to Slovakia and Czech Republic. Hungary is trying to catch up with R&D expenditures (11% growth), community trademarks (10% growth), and license and patent revenue from abroad (9.2% growth).

<sup>3</sup> For an exact definition, please refer to: [http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index\\_en.htm](http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index_en.htm)

The innovation efficiency ratio<sup>4</sup>, which shows how much innovation output a country is getting for its inputs, indicates a huge disparity between the V4 countries, with Czech Republic taking the 11th spot among 141 economies, Poland being ranked at the 93rd place, and Hungary and Slovakia taking places somewhere between (35th and 48th place respectively).

Table 6: Selected indicators representing innovativeness in V4

	EU AVERAGE	PL	CZ	SK	HU
<b>Current performance (2007-2014 growth rates)</b>					
Innovation Efficiency Ratio	-	0,66 (93 <sup>rd</sup> )	0,89 (11 <sup>th</sup> )	0,76 (48 <sup>th</sup> )	0,78 (35 <sup>th</sup> )
Gross Domestic Expenditure on R&D = GERD (% 2014 GDP)	2.03	0.94	2	0.89	1.38
New doctorate graduates per 1000 population aged 25-34*	1.8 (2.6%)	0.6(-7%)	1.7 (6.4%)	2.4 (10.4%)	0.9 (3.7%)
Scientific publications among the top-10% most cited publications worldwide as % of total scientific publications of the country	11 (1.5%)	3.8 (3.2%)	5.6 (4.6%)	4.2 (6.7%)	5.3 (1.5%)
Non-EU doctorate students as a % of all doctorate students	25.5 (3.5%)	1.9 (-4.4%)	4.4 (4.3%)	1.5 (14.4%)	3 (-1.1%)
R&D expenditure in the public sector (% GDP)	0.72 (1.9%)	0.48 (3.8%)	0.87 (8.2%)	0.44 (7.2%)	0.41 (-2.5%)
Number of public-private co-authored research publications	50.3 (2.3%)	4.7 (8.7%)	25.1 (7.9%)	13.7 (8.7%)	26.8 (3.1%)
R&D expenditure in the business sector (% GDP)	1.29 (1.9%)	0.38 (12.2%)	1.03 (4.8%)	0.38 (8.8%)	0.98 (10.7%)
SME introducing product or process innovations (% of SMEs)	30.6 (-1.7%)	13.1 (-6.2%)	30.9 (-0.5%)	17.7 (-2.7%)	12.8 (-3.8%)
Employment in fast-growing enterprises in innovative sectors (% of total employment)	17.9 (0.5%)	19.3 (1.6%)	18.7 (1.9%)	19.2 (-0.1%)	19.1 (0.7%)
Employment in knowledge intensive activities (% of total employment)	13.8 (0.6%)	9.6 (0.9%)	12.9 (2.0%)	9.6 (-0.7%)	12.8 (0%)
Exports of medium and high-technology products as a share of total product exports	53 (-0.8%)	56.6 (-0.2%)	62.5 (0.2%)	63.6 (1.6%)	66.3 (-1.1%)
Knowledge-intensive services exports as % of total services exports	49.5 (0.7%)	26.6 (3.3%)	35.2 (-0.9%)	31.3 (9.2%)	28.8 (3.3%)
Cultural & creative services exports as % of total exports	-	1	0.6	0.4	1.5
Creative goods exports as % of total trade	-	3.9	10.1	10.5	6.2

\* The average annual growth rates were calculated with a following formula:  $AAGR = ((Value\ end\ of\ period) / (Value\ beginning\ of\ period))^{(1 / (Number\ of\ years))} - 1$  where the number of years = 7

Source: European Commission, Eurostat, Global Innovation Index

The V4 countries are moving up the ladder of the Bloomberg Innovation Index ("BII"). The BII assesses a country's innovativeness by measuring its R&D intensity<sup>5</sup>, manufacturing value-added<sup>6</sup>, High-tech density<sup>7</sup>, tertiary efficiency<sup>8</sup>, research personnel<sup>9</sup>, and patents<sup>10</sup>. The Global Innovation Index also ranks the V4 economies among the top 50 innovative countries in the world.

One area in which we had the worst results were so-called "innovation linkages", depicting, among others, university/industry research collaboration and the state of cluster development in a country. Poland was the worst (102 out of 141 countries), while Hungary (83rd), Slovakia (69th), and Czech Republic (53rd) also have room for improvement. R&D does little good if it stays bottled up in the laboratory.

4 A ratio of the so-called Output Sub-Index score (provides information about outputs that are the results of innovative activities within the economy) over the Input Sub-Index score (is comprised of 5 input pillars that capture elements of national economy that enable innovative activities: institutions, human capital and research, infrastructure, market and business sophistication).

5 R&D expenditure as % GDP.

6 Measured as % GDP per capita.





7 Number of domestically domiciled high-tech public companies as a share of world's total high-tech public companies.

8 Total enrolment in tertiary education, regardless of age, as % the post-secondary cohort, % labor force with tertiary degrees, annual new science and engineering graduates as % total tertiary graduates and as % total workforce.

9 Professionals, including PH.D. students, engaged in R&D per 1mn population.

10 Resident patent filings per 1 mn population and per \$100bn GDP, patent grants as a share of world total.

Table 7: Innovation indices

	POLAND	CZECH REPUBLIC	SLOVAKIA	HUNGARY
				
<b>BLOOMBER INNOVATION INDEX 2016</b>	<b>23<sup>RD</sup></b>	<b>31<sup>ST</sup></b>	<b>39<sup>TH</sup></b>	<b>30<sup>TH</sup></b>
<b>GLOBAL INNOVATION INDEX 2015</b>	<b>46<sup>TH</sup></b>	<b>24<sup>TH</sup></b>	<b>35<sup>TH</sup></b>	<b>36<sup>TH</sup></b>

Source: Bloomberg Innovation Index, Global Innovation Index, Cornell University (2015)

## Conclusions

During the past 25 years, all V4 economies have gone through radical changes aimed to transform them into democratic, free market economies. Based on the statistical data presented above, it is fair to say that, on average, our societies are healthier, richer, and more educated. However, in assessing a country's prospects, one should not only look at rankings. A recent example of their misleading nature has been Egypt. In 2008, Egypt was ranked as the top reformer in the World Bank's Doing Business ranking. The country was praised for slashing the minimum capital requirements for companies and halving start-up time and cost. However, many of these reforms remain largely only on paper, with minimal contribution to living conditions of ordinary Egyptians. Having said this, we acknowledge the problems our economies are struggling with (especially the lack of governmental efficiency, regulatory burdens, and taxation), but our focus is on the ideas and solutions that might further contribute to the attractiveness of our region.

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## 2. THE FUTURE OF ENTREPRENEURSHIP

Paweł Michalski

### 2.1 Executive Summary

**Entrepreneurship** propels innovation, competitiveness and job creation. It is therefore crucial to any economy to provide the best conditions for entrepreneurs. We acknowledge that the success of Visegrad's economies over the last 25 years was to a high extent driven by visionary entrepreneurs. If the Visegrad Group aims to further boost its economies, it has to create an environment favourable to entrepreneurs.

Successful entrepreneurial ecosystems are characterized by intertwined relations between its human, financial and professional resources, acting within an adequate institutional framework. These characteristics are very hard to replicate, because entrepreneurship is not one dimensional. For the purpose of this report we construed a **dynamic entrepreneurial model** consisting of **six different dimensions** that must fit together and play their respective roles. In order to create a 'Visegrad Valley', that could compete with Silicon Valley, we propose solutions to the issues troubling our economies in these areas.

- 1. Institutional framework.** Programmes aimed at helping entrepreneurs are often producing lacklustre results but are rarely cancelled in due time. It is important to review the array of entrepreneurial programs in V4 countries, cancel the ineffective ones and set milestones and deadlines to the rest. If they will not produce the intended results they should be aborted as quickly as possible. What is more, public bodies often do not understand entrepreneurial risks, although their aim is to develop policies to support, not frustrate businesses. We recommend to establish a dialogue through establishment of special departments in the regulatory offices, dedicated to support entrepreneurs with the regulatory obscurity. We also believe that tackling taxation and bankruptcy issues in our countries would help develop a friendlier environment for entrepreneurs.
- 2. Educational systems** in the V4 countries should start teaching entrepreneurship sooner than at university level. We encourage schools to collaborate with business. Teachers should be treated more like start-up founders or even venture capitalists – they should be given more freedom to experiment with the curriculum and their best ideas should be “sold” to other teachers. We also recommend to adopt an approach of mixing theoretical with practical education, for example through “V4 Work and Study Programs”, which would enable gaining experience abroad. Finally, V4 universities should join the global competition in education by developing their own massive online open courses (“MOOCs”). These courses should showcase the abilities to teach advanced concepts at local universities and promote them globally, as well as advertise the best educators.
- 3. Support quality research** and boost human capital by establishing technology transfer managers at local universities with the job to promote and commercialize scientific findings. The establishment of venture funds at universities, which would invest in university spin-offs and offer other venture services would further enhance the effectiveness of commercialization endeavours.
- 4. Access to capital** and financing requires a robust venture capital sector. To build one, we recommend to expand the potential investor base, for example with help of various tax incentives, dedicated VC investment platforms.
- 5. Sharing experiences and resources** in knowledge-based economies becomes increasingly important. We recommend to create an open environment by first, removing barriers for V4 citizens who want to work and study abroad, second, attract global talents to come to work and study in our countries, third reconnect expats and global talent by building and facilitating professional networking organizations, e.g. “Visegrad Connect”.

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6. Entrepreneurial culture is the glue that holds everything together. It supports experimentation and risk-taking and does not stigmatise failure. It rather praises entrepreneurship's role for the economy as a whole and supports it as a valid and respected career choice. If the V4 countries want to develop a genuinely competitive entrepreneurial environment they should incentivize this culture.

Successful ecosystems are not created with single policy interventions – they require a lasting and patient commitment. They are a product of constant development, with inevitable failures and tweaks over time. With this report our hope is to support this process.

## COMMENT

*The V4 economies are in the pivotal moment. The first 25 years of entrepreneurship focused mostly on creating firms which were locally or regionally focused and were imitating business models and solutions already existing on the developed market. The region did a good job catching up with the developed countries. Now the bar for the entrepreneurial challenge was raised - we have to think globally and build companies which will be successfully competing with businesses built not only in the region, but places like San Francisco, Singapore, London or Berlin. In order to do that the entrepreneurs from the region need to be plan for the global success from the very beginning. That very often means going outside of their comfort zone, moving to places like London or Silicon Valley and competing with the best in the world from the very beginning.*

*Companies in this region struggle with two key issues: limiting mindset and the ability to scale. Historically there were not many globally successful entrepreneurial role models coming out from the region. As a consequence, local entrepreneurs have more modest (they might say realistic) ambitions, when compared to their counterparts from the US or western Europe. Another big issue is the ability to scale-up. The region is naturally divided into smaller countries (markets) with different languages and cultures. This is an additional layer of complexity that CEE companies have to solve on their way to global success.*

*It sounds difficult, but we should be optimistic about that as the founders of companies such as Eset, Sygic, AVG, Livechat or Prezi has already achieved such success and could be a great inspiration for all upcoming global leaders.*

**Marian Gazdik**, Director of Europe at Startup Grind, CEO & Founder at BHere.tv

**Pawel Tomczuk**, Co-director of London at Startup Grind, Partner & Founder at Trigon Venture Capital



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## 2.2 Introduction to our framework.

Entrepreneurship is vital to **wealth creation and job growth**. It fuels innovation, makes economies more competitive, and encourages people to pursue their dreams. This is why it is in the best interest of every nation to support its entrepreneurs.

The environments in which entrepreneurs operate are often referred to as **ecosystems**. An entrepreneurial ecosystem is characterized by its human and financial resources, proper infrastructure as well as adequate governmental policies. Key features that determine whether an entrepreneurial ecosystem is successful include<sup>11</sup>:

1. legal and regulatory framework that provides certainty ("**institutions**"),
2. good educational system that responds to the needs of entrepreneurs and their work force ("**education**")
3. quality of human capital ("**research**"),
4. access to capital and financing ("**capital**"),
5. mechanisms of sharing experience and resources ("**networks**"), and
6. supportive culture that embraces both success and failures ("**culture**").

It is essential to remember that entrepreneurial ecosystems are not created by a single act; rather, they develop organically as a **product of interactions** between various entities and institutions<sup>12</sup>. For the system to function, all these components must **fit together** and **play their roles** properly. If this happens, firms have good conditions to **adapt and grow**. As they do, their voices become more important in the democratic debate. In this way, they can create a virtuous cycle of entrepreneurial reforms. Because of the broad nature of this phenomenon, the support provided to entrepreneurial ecosystems reinforces **democratic foundations** of the society.

Entrepreneurs are drivers of change that fuels **innovation**. Since the 1950s, economists have emphasised that innovation is crucial to achieve long-term, sustainable development of a country. Joseph Schumpeter even argued it is **the most important feature** of capital market economy<sup>13</sup>. The strong connection between technological progress and economic prosperity goes back to studies of Moses Abramowitz, who realized there are, ultimately, only two ways of increasing the output of the economy:

- increasing the number of inputs that go into the productive process (for example, by raising the retirement age), or
- developing new ways to get more output from the same inputs.

The analysis conducted by Abramowitz led to a conclusion<sup>14</sup> that the actual growth in the output of economy is 85% attributable to innovation<sup>15</sup>. In other words, the economic future of a country depends not only on what and how much it produces, but how it produces it.

Relying on this knowledge, we tried to find underlying conditions for creation of a successful regional entrepreneurial ecosystem. We asked ourselves several questions:

- Under which conditions can entrepreneurs thrive in V4 countries?
- What makes a healthy entrepreneurship ecosystem possible?
- What would be the reasons for start-ups and potential high-flyers to stay in V4 rather than go abroad?

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11 This approach is coherent with the "Triple helix" concept, developed by Henry Etzkowitz and Loet Leydesdorff. The Triple Helix thesis is that the potential for innovation and economic development in a knowledge society lies in a university, industry, and government cooperation. Our approach is also consistent with Daniel Isenberg's six key domains of entrepreneurial ecosystem: conducive culture, enabling policies and leadership, availability of appropriate finance, quality human capital, venture-friendly markets for products, and a range of institutional supports (see Babson Entrepreneurship Ecosystem Project at <http://entrepreneurial-revolution.com/>).

12 Steven Koltai, the creator of the Global Entrepreneurship Program for the U.S. Department of State, developed a so-called Six + Six Model, which highlights the six pillars to a successful entrepreneurship ecosystem (identify, train, connect & sustain, fund, enable, and celebrate entrepreneurs) and the six participants who must be involved in their implementation (NGOs, corporations, foundations, government, academic institutions, and investors).

13 Schumpeter J., *Capitalism, Socialism and Democracy*, New York, 1942

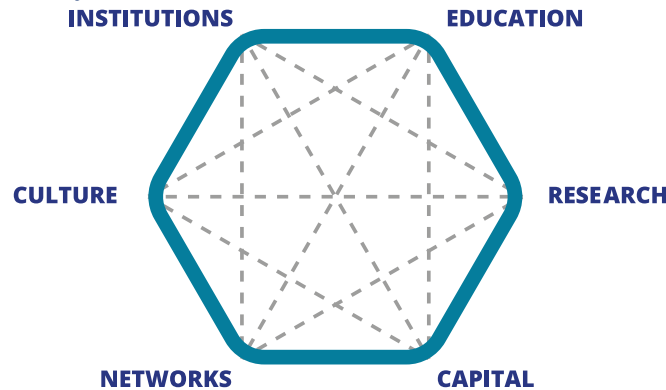
14 Abramowitz, M., "Resource and Output Trends in the United States since 1870", *American Economic Review* 46, 1956, p. 5-23

15 This conclusion was further reinforced by various studies in the late 1950s and 1960s, with the most famous example of Robert M. Solow, "Technical Change and the Aggregate Production Function" for which he later won the Nobel Prize.

- How to achieve this optimal state?

Developing entrepreneurial policies is difficult, because entrepreneurship is not one-dimensional. A single intervention could not possibly address all dimensions. However, designing a plan and executing it towards the intended outcome is far better than applying a loose collection of measures.

Figure 4: Our model of entrepreneurial dynamics model



We will elaborate on these areas in the paragraphs below. We hope to spark the well-thought-of process of establishing foundations upon which the next, even better Silicon Valley could emerge in the Visegrad region.

We had chosen to start with the legal and regulatory framework, because we believe well-considered policies are crucial in shaping a supportive environment for entrepreneurs. Let the example of development of two distant countries – Jamaica and Singapore – be the illustration of that fact.

### Case study – Jamaica and Singapore<sup>16</sup>

Both states are relatively small, with ca. five million residents apiece. These two nations were about equal in wealth (measured by GDP) by the time of the establishment of their independence in the 1960s. In 1965, the gross domestic product (in current USD) was USD 552 per capita in Jamaica and USD 516 per capita in Singapore. Almost 50 years later, the situation is very different. Singapore's GDP per capita is now USD 56 285 (in current USD), while Jamaica's GDP per capita is USD 5 105, eleven times smaller. What are possible explanations? In Singapore's growth story, much credit has been given to its supportive policies. The government introduced an array of measures, such as:<sup>17</sup>

- investing in infrastructure,
- subsidizing the system of education<sup>18</sup>,
- maintaining an open and corruption-free economy,
- subsidizing firms and research in targeted sectors (especially biotechnology),<sup>19</sup>
- injecting public funds to venture firms seeking to invest in Singapore,
- awarding failed entrepreneurs to encourage risk-taking,
- establishing sovereign wealth funds.

The contrast is striking. While Singapore has been striving, what happened to Jamaica? Apart from spending decades in political instability (shifting from a market economy to socialist doctrine and back again), the inability of its business to grow was also manifested in the barriers to entrepreneurs. Jamaica ranked 122<sup>nd</sup> for registering property (with the cost associated thereto of 9,8% of the value of the property), 146<sup>th</sup> for paying taxes, 146<sup>th</sup> for trading across borders, and 107<sup>th</sup> for enforcing contracts in the 2016 World Bank's Doing Business Report. To put these numbers into practice, it suffices to imagine how higher costs of registering property discourages people from registering their holdings. Combined with an unsupportive judiciary system, property rights erode, putting entrepreneurs at higher risk. This could mean that fewer companies receive loans from banks against their holdings, and the cost of capital rises.<sup>20</sup>

16 We are fully aware of the fact that Jamaica and Singapore are two very different countries, and geography does play a role; however, we use this example to show that well-considered policies could have improved the state of economy.

17 Lerner, J., The Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital have Failed – and What to Do About It, 2009, p. 18

18 For example, funding at the National University in 2001 was three times higher than in 1996.

19 Creation of Biopolis, a seven-building complex that cost approx. USD 500mn, including state-of-the-art laboratory facilities, may be one of the most ambitious examples. What is more, top researchers from the best institutions in the world (including MIT, Kyoto University and the University of California) were lured to the country with generous research funding, gigantic salaries, and a supportive political climate.

20 It should be noted, however, that Jamaica has seen some improvements in the recent years. The cost of complying with tax and associated administrative regulations has been reduced by 27% (from 47,9% in 2010 to 35,2% in 2016), while starting business becomes easier with the introduction of streamlining internal procedures and reducing the number of forms required to be filed.

Institutions are a legal infrastructure that makes it easier for new firms to enter the market and easier for existing ones to stay in it. Government initiatives in this area can be broadly categorized by the **level of interventionism**, with actions creating “more hospitable” **environment** on one and **direct interventions** on the other end of the scale. All of these actions remain parts of the same equation and are often deployed at the same time.

## 2.2.1 Direct interventions

Direct interventions are regulatory actions taken by a government in order to affect or interfere with decisions made by individuals, groups or organizations. These actions can vary from imposing taxes or establishing an entity to deploy public money (e.g. buy a private firm). Looking across time, we may come to a conclusion that direct interventions are more appealing to politicians. The importance of these interventions, however, should not be underemphasized; according to data gathered by Block and Keller, 88% of key innovations that emerged between 1971 and 2006 in the US, were funded (at least partially) by state subsidies.<sup>21</sup> Silicon Valley, Singapore, Tel Aviv, Bangalore, as well as Guangdong and Zhejiang<sup>22</sup> provinces in China benefited from government-sponsored projects. Nevertheless, we should remember, for each effective intervention, there have been numerous failures committed.

### Case study – France and its electronics industry

In the 1980s, the socialist government in France focused on developing national electronics business. It created plans to build a high-technology cluster in Brittany - the “French Silicon Valley.” The problem was that the region had only little entrepreneurial tradition and was dominated by lower-productivity industries.<sup>23</sup> Still, the government spent approx. USD 6bn to acquire several electronics giants, including CII Honeywell, Bull, and Thomson. Several promising smaller firms were either directly acquired or forced to merge with the government’s holdings. Once these firms were nationalized, the majority of innovative ideas were canceled or extinguished, as the administration was more concerned about preserving jobs at large, existing factories rather than pursuing risky, often smaller ventures. Subsidies for annual losses grew from USD 226mn in 1980 to USD 4.6bn in 1982. As a result, the government had to either reprivatize or restructure most of these firms. The companies it continued to hold were subject to employment cutbacks. For instance, Bull halved the number of its employees between 1991 and 1999.

2015-2016 Global Competitiveness Index	Singapore	Jamaica
INSTITUTIONS*	2 <sup>ND</sup>	80 <sup>TH</sup>
HIGHER EDUCATION AND TRAINING	1 <sup>ST</sup>	84 <sup>TH</sup>
INNOVATION	9 <sup>TH</sup>	67 <sup>TH</sup>
BUSINESS SOPHISTICATION	18 <sup>TH</sup>	66 <sup>TH</sup>
OVERALL	2 <sup>ND</sup>	86 <sup>TH</sup>

*\*Describing, among others, how efficiently the government spends public revenue or how burdensome it is for companies to comply with public administration’s requirements.*

To put it in context, let us consider Taiwan, a leading producer of hardware for major computer vendors in the world. While policymakers in other Asian countries typically target large technological champions and promote them, in Taiwan, support was given to entire sectors. In the 1990s, numerous subsidies were given to small firms expecting many would fail, but some may become global players. By 1995, this strategy began paying off, as Taiwan ranked 4th in the world in computer hardware production and exports. Taiwan’s success in the electronics industry was possible because of a coordinated government strategy to support small, innovative companies that adapt well to fast changes in technology. This enabled Taiwan’s computer industry to move from equipment manufacturing for multinationals to establish their own intellectual property.<sup>24</sup>

21 Block, F., Keller, M.R. (eds.), “State of innovation: The U.S. government’s role in technology development”, Boulder, Paradigm Publishers, 2011

22 It is worth mentioning, however, in China, private entities and initiatives are so seldom that most of the economic interventions in China are, by definition, direct interventions.

23 See for instance: OECD Territorial Reviews: France 2006, p. 46, 50

24 For more about the Taiwanese incentive programs, see Kraemer, K. L., Dedrick, J., Chin-Yeong Hwang, C., Tu, T., Yap, C. S., Entrepreneurship, Flexibility, and Policy Coordination: Taiwan’s Computer Industry, “Information Society” 12 (1996); Saxenian, A.L., The Silicon Valley-Hsinchu Connection: Technical Communities and Industrial Upgrading, 1999

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The problem with failed government interventions is they are rarely “killed off”, even if they have been declared unsuccessful or after they have exhausted their usefulness. These problems often arise if they do not consult with those who really need them – the entrepreneurs. Besides, various lobby groups, who benefit from public resources, are not likely to see the state support go. Consider, for example, an entrepreneurship incubator. Imagine such an incubator incubated no new venture for five consecutive years. Should this institution receive any further funding?<sup>25</sup> This rhetorical question gives the underlying argument for our first recommendation.

**Recommendation: Set realistic goals for direct intervention programs. Kill them off quickly if they do not show intended results.**

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<sup>25</sup> This, again, is a real life example of a program launched in 1999 in Australia – the Australian Building on Information Technology Strengths (BITS). It started with USD 158mn to establish eleven incubator centers for small and medium companies. It was awarded further funding in 2001 and 2004, although its evaluation implicated the program had not been successful. Quite shockingly, most funding went not to the incubator, but to its managers. In one example, only 31% of the funding went to start-ups. For more see: <http://www.bsi.com.au/incubators-program.html> and Lerner, J., The Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital have Failed – and What to Do About It, 2009, p. 84

## 2.2.2 Supportive legal framework

Successful entrepreneurial ecosystems function within a well-operating legal framework. A legal framework is a broad system of rules that governs and regulates decision making, agreements, etc.. Based on established research<sup>26</sup>, we deem following policy areas to be essential to the creation of a successful legal framework:

1. simplifying business entry procedures,
2. defining and ensuring strong enforcement of property rights,
3. removing restrictions on competition, especially in industries reserved for state-owned enterprises,
4. establishing simple and efficient labor laws, allowing wages to be determined by market forces,
5. simplifying and/or reducing burdens connected with taxation,
6. reducing tariffs and non-tariffs barriers,
7. establishing proper dissolution and bankruptcy regulations,
8. providing equal access to government information on regulations, requirements, and resources,
9. removing price controls,
10. establishing programs that provide entrepreneurs with professional assistance, when needed.

Over the last 25 years, our countries have experienced improvements in most of these areas. However, if we want to create an environment in which new ventures can succeed, public bodies must understand entrepreneurial risks and develop policies to support high-potential businesses even further.

### Case study: Estonia's digital revolution

Skype is perceived as one of the most successful companies from CEE. Nowadays, it comes as no surprise that its origins lay in Estonia. How could a small country of 1,3mn inhabitants, that used a telephone exchange system from 1938 at the moment of regaining its independence from the Soviet Union in 1991, become a synonym for start-ups? It may be attributed to the bold and rapid steps the Estonian government took after the transformation. Already in 2000, the government created a secure online identification and started treating digital signatures equal to 'real ones'. The effort in digitalizing the country not only enabled Estonia to transform its country, but more importantly it enabled to leapfrog the economy and society into the digital age. Citizens could open companies, fill in tax returns, receive prescriptions from their doctors, sign legal documents, or even vote, without leaving their homes. The economic gains from the increased effectiveness have been enormous. The average savings from e-tax were estimated at seven EUR per income and social tax declaration, totalling 726,000 in total, and the cumulative time savings connected to the Estonian parliamentary elections amounted to 11,000 working days – EUR 504,000 in average wages (both 2011).<sup>27</sup> The positive effects from the digitalization of governmental services not only increases cost and time efficiency, it also builds transparency and accountability. That, combined with a wide range of further initiatives<sup>28</sup>, results in "E-stonia's" perception as the first-league player on the global start-up map.<sup>29</sup>

### Dealing with taxation issues

It is often emphasized by the private sector that low taxation is one of the most encouraging factors when choosing the right investment venue. It might occur counterintuitive to hear that California, where Silicon Valley is located, does not provide a low-tax environment. It is quite the opposite. California has one of the **highest state Corporate Income Tax** rates in the US (8,84% flat), the **highest state Personal Income Tax** rate in the US (up to 13,3%, depending on the income level), and the highest **state sales tax** rate (7,50%). With state tax collections per capita of USD 3 594, it makes for a 10<sup>th</sup> spot

<sup>26</sup> Sullivan, J.D., Shkolnov, A., "The Prosperity Papers #1: Entrepreneurship", Economic Reform Issue Paper No. 0401, 2004

<sup>27</sup> <https://e-estonia.com/measuring-impact-e-services-case-study/>

<sup>28</sup> E.g. granting universal access to the Internet or introducing coding classes for children of the age of 5.

<sup>29</sup> <http://www.fastcompany.com/3030100/bottom-line/4-countries-that-are-leaving-silicon-valley-in-their-tracks>

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on the list of the highest tax paying states (per capita) in the US. That is why California is often ranked as one of the most expensive states to start a business.<sup>30</sup> Despite this relatively high cost of doing business California, and especially the Valley, has been a global success.

Nevertheless, it has been argued in economic literature that decreases in capital gains tax rates might increase the attractiveness of becoming an entrepreneur.<sup>31</sup> It does so by directly affecting the willingness of investors to supply capital, on one hand, and increasing the demand of entrepreneurs for that capital, on the other. Another approach employed in many countries is to create special tax rates for capital gains from investments in entrepreneurial firms. The United States allowed noncorporate taxpayers (this category includes, i.a., partnerships) to exclude a certain amount of their gains from stock in qualifying small businesses (up to 50%) that have been held for a certain period of time (at least 5 years), reducing the marginal effective tax rate for investors. A similar solution was developed in the United Kingdom, where effective capital gains tax rates on the disposal of business assets held for over two years have been reduced by 30 percentage points to 10%.<sup>32</sup>

These ideas must be read in conjunction with our later recommendations, regarding the venture capital and private equity market. We believe that further incentives are required to build a regional venture market and encourage citizens to invest their money in domestic firms.

### Making bankruptcy more business-friendly

Taxes may be treated as a cost to succeed, but there are obstacles that make the “trying to” even more costly. While all entrepreneurs are striving for success, a majority will fail, and many end up in bankruptcy.

Bankruptcy costs, for instance, discourage entrepreneurs because of their often punitive character. It takes approximately 2 (Hungary), 2.1 (Czech Republic), 3 (Poland), and 4 years (Slovakia) to resolve insolvency in the V4 countries. The associated cost of proceedings spreads between 15 (Hungary, Poland) and 18 (Slovak Republic) per cent of the debtor’s estate value.<sup>33</sup> Besides the economic costs of inefficient bankruptcy proceedings, failure and bankruptcies still have a strongly stigmatizing effect on entrepreneurs. Business entities that went into distress with their venture face severe difficulties in developing other undertakings. Therefore, the potential of learning from their experiences is left unutilized by themselves, their (potential) peers, and our economies.

Being an entrepreneur or working in a start-up has inherent risks. Successful business hubs have been praised for embracing those risks and accepting inevitable failures. In Singapore, there used to be an initiative to award entrepreneurs, who overcame a commercial failure, learned how to adjust and, subsequently, succeeded. Our culture is much more risk-averse. We often hear not to run before we can walk. And if we fail, we get punished.

We have to change this attitude and allow ourselves to fail and to learn from both our and other people’s mistakes. This vision is encouraged by studies showing that the process of selection not only leads to less productive firms exiting and the more productive ones thriving, but also provides an important contribution to aggregate employment and productivity growth.<sup>34</sup> We have to **put an end to discouraging laws that punish people for trying to do business and introduce entrepreneur-friendly resolutions to bankruptcy issues.**<sup>35</sup>

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30 Compare for instance Forbes’ annual ranking “Best States for Business” <http://www.forbes.com/best-states-for-business/> and the Tax Foundation’s Facts & Figures 2016 ranking at <http://taxfoundation.org/article/facts-figures-2016-how-does-your-state-compare>

31 Poterba, J.M., Venture Capital and Capital Gains Taxation, in “Tax Policy and the Economy”, Summers, L.H. (ed.), 1989, p. 47-67; also Gompers, P.A., Lerner, J., What Drives Venture Capital Fund-Raising?, in: “Brookings Papers on Economic Activity: Microeconomics”, 1998, p. 149-192; and Amour, J., Cumming, D., The Legal Road to Replicating Silicon Valley, Economic and Social Research Council, 2003

32 See: Organisation for Economic Cooperation and Development, “Venture Capital Policy Review: United Kingdom, 2003

33 As a comparison, it takes 11 months, on average, to resolve insolvency in Finland, with an average cost of 4% of the debtor’s estate and the company most likely sold as a going concern.

34 Bartelsman, E., S. Scarpetta and F. Schivardi (2005), “Comparative analysis of firm demographics and survival: evidence from micro-level sources in OECD countries”, *Industrial and Corporate Change*, 14(3) 365-391

35 In recent years, there have been many initiatives (e.g., France, Italy, Switzerland) to lift punitive legal sanctions imposed on managers and even nonexecutive personnel in case of bankruptcy.



## Professional assistance to entrepreneurs

While the indirect role, i.e., shaping general policies, is significant, assisting entrepreneurs and aligning policies towards their best interest is crucial in building a successful entrepreneurial hub. Some economists suggest that countries characterized by institutions that support entrepreneurial activity will, other things being equal, have higher levels of entrepreneurship than countries characterized by institutions that do not support entrepreneurship.<sup>36</sup> It means, that on one hand, entrepreneurs should be ensured that someone is listening to their needs, on the other, public officials and politicians must understand the business world better if they really want to support it. This is especially important in the areas where regulatory constraints are needed and collaboration between public and private is essential.

A positive example is the Innovation Hub, launched by the UK's Financial Conduct Authority ("FCA") and Her Majesty's Treasury. The aim of the Hub is to provide help to entrepreneurs pursuing innovative financial ventures – both regulated and non-regulated. The support includes help with understanding the regulatory framework, assistance in preparation of applications for business authorization, and a dedicated contact-point for up to a year after the authorization. But the work is far from done, here. Recently, the FCA and the Australian Securities and Investments Commission ("ASIC") have entered into an agreement, under which innovative fintech companies in Australia and the UK will receive support from regulators as they attempt to enter each market. As we may read in the public statement, the regulators "will provide support [...] before, during and after authorization to help reduce regulatory uncertainty and time to market."

**We strongly recommend to establish departments in the regulatory offices dedicated to support entrepreneurs and enter into agreements with similar bodies in all V4 countries.**

## 2.3 Education – how to build an educational system that responds to the needs of both entrepreneurs and their work force?

Silicon Valley is blessed with top academic institutions, such as Stanford University and Berkeley, which attract top students, professors and researchers. Similarly, Cambridge, Massachusetts evolved with the strong presence of MIT and its research, innovations, and inventions, just as Boston did with Harvard. These universities offer courses that blend theory and practice, especially in the field of entrepreneurship and technology. They place students with companies from around the world and let them work with real life problems faced by those businesses. Support is offered to everyone, from students to retired alumni, on all stages of the business life-cycle, from developing ideas to preparing an IPO. Consider, for example, a class called Launching Technology Ventures at Harvard University, where students are trained in the art of launching, building, and scaling businesses.

Our regional academic institutions do not fare well against global competitors, at least, according to the most known rankings.<sup>37</sup>

Name of the institution	Country	Shanghai Ranking	TIMES Higher Education Ranking	QS Top Universities Ranking
Charles University in Prague	CZ	201-300	401-500	279
Brno University of Technology	CZ	--	401-500	601-650
Eötvös Loránd University	HU	401-500	601-800	601-650
University of Szeged	HU	401-500	601-800	501-550
University of Warsaw	PL	301-400	501-600	344
Jagiellonian University	PL	301-400	601-800	411-420
Comenius University in Bratislava	SK	--	601-800	651-700
Slovak University of Technology in Bratislava	SK	--	601-800	--

<sup>36</sup> Acs, Z.J., Laszlo, S., Entrepreneurship, economic growth and public policy, "Small Business Economics", 2007, 28 (2), 109-122, and Peng, M.W., Sun, S.L., Pinkham, B., Chen, H., The institutions-based view as a third leg in a strategy tripod, "Academy of Management Perspectives", 2009, 23 (4), 63-81

<sup>37</sup> The data has been pulled out of the websites on April 15th 2016.

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As we all are alumni of universities from V4 countries, who also have experience from abroad, we can fully confirm the statistics presented above. Regrettably, the transformations of our economies did not go in pair with our educational sectors, often leaving our universities in old structures. We are still doing research for the sake of research, far away from the demands of the real economy. We have to find a way to change that.

### 2.3.1 Engage students with the business world

An educational system involved in cultivating and nurturing an entrepreneurial ecosystem must in fact exhibit its own entrepreneurial spirit. In order to build this spirit, we need to reconsider the long-established, one-size-fits-all model of our educational systems. Based on our own experience, we believe that this model does not offer experiential learning that changes mindsets and provides the necessary skill to thrive in the business world.

#### Case study – business@school<sup>38</sup>

In 1998, even before the first PISA study had taken place, the Boston Consulting Group (“BCG”) launched business@school – an initiative that gives senior high school students (aged 15 to 19) the opportunity to get a closer look at business, including hands-on experience. The project covers one school year and can be conducted during class time or after school. It is divided into three phases:

- Analysis of a large company,
- Analysis of a medium-sized or small company,
- Development of a business concept and business plan.

Each phase takes 2 to 3 months and ends with a presentation. Participating students and teachers meet regularly (at least once per week) to plan project work and discuss open issues. All teaching material (business basics, business plan templates, tips for effective teamwork, etc.) are available online on a dedicated platform. Teachers need not have prior business experience or education to participate. Enthusiasm and openness to project work suffices. Regional introductory workshops are held before summer break with experienced teachers and coaches to provide an introduction to the project. Throughout the projects, teams are coached by BCG consultants and volunteers. Teams of 4 to 6 students present their cases at final local, regional, and national levels. Juries of experts award prizes for the best concepts.

The project started at two pilot schools in Daun and Hockenheim, and now, over 90 schools in Europe participate in the challenge. In 2002, BCG received the Freedom and Responsibility award for outstanding entrepreneurial commitment to social objectives in Germany. There are many prominent firms among partners of the project, including Commerzbank, Oracle, Viessman or Axa.

In our opinion, entrepreneurial education must start sooner than at the university level. Although some classes already teach „entrepreneurship” at the high-school level, these are mostly theoretical courses, loosely linked to real business issues. We are not alone in this thinking- Social Wolves, a social start-up from Poland organizes the „Exempt from Theory” project. It is a contest for secondary and academic students that aims to develop practical abilities in project management and encourage social activities.<sup>39</sup> Thanks to the project’s strategic partners, participants receive help from several dozen directors and managers from the biggest companies in the country. The project offers access to an interactive portal and mentors support. The winners receive a cash bonus and prestigious titles, but most importantly, an upstart, while entering the job market. The first edition of the project gathered 7000 participants, who worked on 339 projects. The number of beneficiaries was estimated at 500 000.

**Recommendation: we encourage the business community to establish similar programs. These could be supported and aligned by public bodies, but should remain private business initiatives. This is also a great way to find and teach prospective employees.**

While continuing their education at university level, students must engage with real-world business issues and establish close ties to the business world. For instance, the South East European University in the Republic of Macedonia organizes a “Work and Study Program.” All students who follow full-time

<sup>38</sup> For more visit: <https://www.business-at-school.net/www/home.php?sid=48826897177193248046089348942250>

<sup>39</sup> For more visit: <http://zwolnienieteorii.pl/en/>

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studies are eligible; however, priority is given to those who need financial aid and those who demonstrate skills for the workplace. Students may be engaged by several departments and laboratories. Most importantly they can be hired by companies using the facilities of the SEEU TechPark to work on real projects. The Work and Study Program is meant to help cover the payment of tuition fees during the academic year, but is also a way to find the best talent among the students.<sup>40</sup>

**Recommendation: We recommend to adopt the approach of mixing theoretical with practical education and to organize the “V4 Work and Study Programs.” This offer might compliment current “study abroad” programs, but would be more focused on working experience.**

After finishing university-level education, we should not only encourage people to pursue their entrepreneurial ideas, but also to provide them with real assistance in doing so. We will expand on this idea in the following chapter, but let us note that such a liaison between university and industry could be offered by technology transfer offices, like the Humboldt-Innovation GmbH, a subsidiary of the Humboldt-Universität zu Berlin that offers a variety of services from trainings to corporate financing.

### 2.3.2 Engage teachers with business-thinking

We should **treat teachers much more like start-up founders or even venture capitalists**. Teachers ought to be able to “incubate” and “accelerate” their and their students’ ideas, be financially supported for their best initiatives, and receive access to a pool of mentors who could boost their “growth”. Should they succeed, we have to encourage them to “go global”, i.e. promote their success and attract more talent to their classes.

#### Case study – “Teachers Pay Teachers”

After graduating, Paul Edelman, a New York City public school teacher, arrived at a middle school in Brooklyn. He quickly realized that his students did the best when he incorporated ideas from other teachers. However, he had limited access to educators outside of his school. And so he created the Teachers Pay Teachers (“TpT”). TpT is a community of millions of educators (3,8mn active members) who share their work and insights with each other. It became the first and largest open marketplace where teachers share, sell and buy original educational resources. TpT offers lessons plans, interactive notebooks, exams and white board activities. If a teacher can’t find good materials for her classroom – she may access over 2mn resources available online in one place. Thanks to TpT the teacher-authors are able to evolve and improve quickly, because they receive feedback for their offerings.

High-schools and universities have to measure teaching quality systematically. They should reward the best and make place for teachers with industry experience. We have to attract more practicing business people to teach students how to succeed. We cannot expect next generations to think differently if we employ the same old teaching methods: without critical thinking and practical applications of the gained knowledge.

**Recommendation: Treat teachers more like start-up founders. “Sell” their best products on the market. Enable and encourage more businesspeople to join the staff.**

### 2.3.3 Join the global competition in education

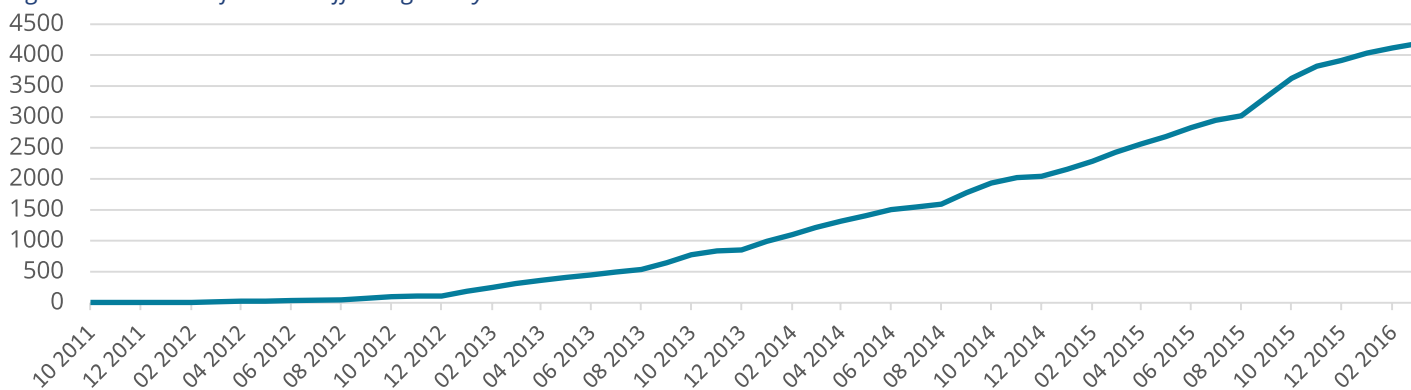
Among the 1880 courses offered on Coursera and more than 650 courses taught on edX, we did not find any coming from V4 universities. Both Coursera and edX are online platforms that provide universal access to the world’s best education. They partner with top universities and organizations to offer unique learning experiences. By now, 143 academic institutions from 28 countries have partnered with Coursera, and 46 universities have their offerings on edX. Partners include: Harvard, MIT, Stanford, and other educational giants. Most courses not only offer an interactive network of students, textbooks, and video classes, but also reward students with certificates of accomplishment (at little to no cost).

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40 <http://www.seeu.edu.mk/en/future-students/financial-aid#work>

Courses offered on platforms, like Coursera or edX, are referred to as s, for Massive Open Online Courses. According to data collected by Class Central, the MOOC space doubled last year. More people signed up for a MOOC in 2015 than they did between 2011 and 2013. The total number of students who signed up for at least one course has crossed 35 million – up from about 16-18 million in 2014.<sup>41</sup> While the MOOC platforms started with merely selected courses, they now offer entire curricula or even degrees - like the iMBA from University of Illinois at Urbana-Champaign.<sup>42</sup>

Figure 1: Number of MOOCs offered globally<sup>43</sup>



We perceive innovation and creativity as the cornerstones of our future prosperity, and yet, education that guides students in developing their abilities to innovate is rarely covered in “teacher” education. Schools systems have focused on mastering one curriculum to move into the next course. Meanwhile, education around the world has become much more about acquiring certain competencies. It is not about what courses we provide; it is about how we prepare students to achieve their goal when they leave. Thanks to globalization, it became easier to receive education anywhere in the world. Our educational system should understand these challenges and prepare students to work in a dynamic, rapidly changing environment.

	EU AVERAGE	PL	CZ	SK	HU
					
Employment in knowledge intensive activities (% of total employment)	13,8	9,6	12,9	9,6	12,8
Knowledge-intensive services exports (as % of total services exports)	49,5	26,6	35,2	31,3	28,8

We can stand aside and let the world of higher education be reshaped, or we can enjoy a future where our influence is growing. If we want to set trends, we have to become exporters of know-how, not only importers. To achieve that state, our universities have to compete with other educational institutions for talent – globally! If people get to choose whether to study at the little known university, ranked in the 4th hundred, or take classes at one of the best institutions in the world, the most talented will choose the latter. One way to change this perception is to share our knowledge and showcase our best academic practices with the help of MOOCs.

**Recommendation: Develop MOOCs at the leading V4 universities. The pioneer projects should focus on teaching entrepreneurship. Teach these in courses both English and local languages to create demand.**

41 <https://www.class-central.com/report/moocs-2015-stats/>

42 <https://www.coursera.org/university-programs/imba>






43 <https://www.class-central.com/report/moocs-2015-stats/>

## 2.4 Research – how to incentivize quality research?

Successful university-business cooperation (“UBC”) is considered an essential driver of building entrepreneurial hubs. If this cooperation works properly, societies benefit from transfer of knowledge in the form of practical solutions. However, our universities still have not developed a framework for fruitful cooperation with the business world. In a study on the cooperation between higher education institutions (“HEI”) and public and private organizations in Europe, 6280 academics and higher-education institution representatives were asked to indicate to what extent their HEI cooperate with business. According to this study, our countries were perceived as ones with the lowest extent of UBC in Europe.<sup>44</sup>

In Poland, the results of the study have shown a significant lack of commitment and cultural orientation to university-business cooperation, as well as commercialization of research and development.<sup>45</sup> It turns out that “Polish higher education institutions managers and academics rate themselves and their environment to be one of the least oriented to university business cooperation in Europe”.<sup>46</sup> Poland ranks as one of the three countries with the lowest influence of business in curriculum development and delivery and the meeting of business needs, right after Greece. It is also identified as a country with the lowest collaboration in and commercialization of R&D. Slovakia and Hungary were also below the mean .

In the case of Poland, the research suggests the main barriers to cooperation in Poland lie in lacking financing (on the university level and external), lacking awareness of university research activities, and limited ability of business to absorb research findings. This might be also applicable to other V4 countries.

	EU AVERAGE	PL	CZ	SK	HU
					
Gross Domestic Expenditure on R&D = GERD (% 2014 GDP)	<b>2,03</b>	<b>0,94</b>	<b>2</b>	<b>0,89</b>	<b>1,38</b>
R&D expenditure in the public sector (% GDP)	<b>0,72</b>	<b>0,48</b>	<b>0,87</b>	<b>0,44</b>	<b>0,41</b>
Number of public-private co-authored research publications	<b>50,3</b>	<b>4,7</b>	<b>25,1</b>	<b>13,7</b>	<b>26,8</b>
R&D expenditure in the business sector (% GDP)	<b>1,29</b>	<b>0,38</b>	<b>1,03</b>	<b>0,38</b>	<b>0,98</b>

While creating successful entrepreneurial hubs in the United States, the U.S. government invested heavily in university-based research. For instance, Cyril Elwell, founder of the Federal Telegraph, raised initial financing in 1909 with the help of Stanford’s president and used the university’s High Voltage Laboratory. The result was creation of human capital in form of scientists, researchers, and innovators. In 1948, MIT started its Industrial Liaison Program (“ILP”), intending to establish relationships with large corporations that would benefit the university with sponsored research and donations. Nowadays, the ILP serves as a facilitated gateway to a wide range of services, from setting up face-to-face meetings to facilitating companies’ engagements with faculty members. This system is designed to “replace the informal, often ad hoc, in which industry technologists get connected with faculty, staff and students at many universities”.<sup>47</sup> In 2013, ILP member companies significantly contributed to financing research at MIT; approximately 54% of all corporate gifts and single-sponsored research expenditures were facilitated by the ILP.

44 Davey, T., et al., The State of European University-Business Cooperation Final Report – Study on the cooperation between Higher Education Institutions and public and private organisations in Europe, 2011

45 Davey, T., et al., The State of University-Business Cooperation in Poland, 2013; there are no country reports for other V4 states

46 Davey, T., et al., The State of University-Business Cooperation in Poland, 2013

47 Tornatzky, L.G., Rideout, E.C., “Innovation U 2.0: Reinventing University Roles in a Knowledge Economy”, 2014, p. 169



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Another measure worth mentioning is the introduction of the Bayh-Dole Act of 1980 that gave US universities automatic title to research funded by the federal government performed at their institutions. Prior to that, the schools had to file for permission to license, which was a lengthy and uncertain process. This legislation resulted in creation of technology transfer offices at many universities and a considerable increase in the patenting of academic research. MIT's Technology Licensing Office ("TLO") was reorganized in 1985. Its essential function became to license patents on MIT-owned inventions to businesses that would develop the technology commercially.<sup>48</sup> The TLO is an esteemed and productive operation. In 2015, it had 795 invention disclosures, 314 US patents issued (out of 469 filed), and 91 licenses granted (not including trademarks and end-use software and 28 companies started).<sup>49</sup> It has also produced "An Inventor's Guide to Startups: for Faculty and Students", which provides members of MIT with information on the MIT Entrepreneurial Ecosystem.<sup>50</sup>

Commercialization of research should be at the center of universities' lifeblood. We could use existing examples as paragons for our local institutions. For instance, the Humboldt-Innovation GmbH ("HI"), a wholly-owned subsidiary of the Humboldt-Universität zu Berlin and the knowledge and technology transfer office of this university, is an example to follow. It was set up to act as a liaison between industry and academia and to "provide universities contribution into invigoration of the region as a center of knowledge and economy [...]"<sup>51</sup>.

HI offers a wide range of services:

- **Research services:** HI promotes and manages R&D agreements and contracts for scientific services between scientists and the private and public sector. Humboldt Innovation can manage all project stages, from initiation and launch to administration and completion. The Innovation Management team of HI helps to recognize the commercialization potential of the research in the early stages and arranges for the steps in this direction.
- **Venture services:** HI consults and supports startups and spin-offs of the University and manages the collaboration with investors and accelerators. These services include managing the spin-off zone at the campus, a pre-incubator that provides space and creative environment to develop successful ideas. Also, HI acts as an agent to help in acquiring different forms of funding for promising university ventures. HI assists with the application for public funding; it can also negotiate subsequent funding by angel investors, venture capitalists, banks, and crowdfunding platforms. Venture services also include validating the research for industry applications. This job is done by two Transfer Managers, who help to acquire financial support for the transfer.
- **Marketing:** HI markets and commercializes resources and rights (including trademarks and archives) on behalf of the University, mainly through licensing or entrepreneurial activity.
- **Consulting:** HI, in cooperation with external partners, offers professional training in knowledge and technology transfer
- **Education:** HI organizes presentations and workshops on knowledge and technology transfer, conducts studies and counsels clients.

Our proposal is to follow this example and establish similar modern and market-based Technology Transfer Managers at local universities. The first actions of these companies should focus on research promotion and management and venture services (as described in the example above), as those areas require immediate attention in the V4 countries. These subsidiaries should employ people with market experience, with extensive knowledge of the industry with which they would have to work. We believe these companies could, potentially, be co-financed by the private sector<sup>52</sup>, as their mission would be to improve the quality of inventions and their market readiness.

**Recommendation: Establish technology transfer managers at the leading local universities on the basis of existing models (e.g., Humboldt Innovation GmbH).**

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48 Polenske, K.R., *The Economic Geography of Innovation*, 2007, p. 271

49 <http://tlo.mit.edu/about/statistics>

50 [http://tlo.mit.edu/sites/default/files/documents/MIT%20Starrup%20Guide\\_Final%2011-19-2010\\_0.pdf](http://tlo.mit.edu/sites/default/files/documents/MIT%20Starrup%20Guide_Final%2011-19-2010_0.pdf)

51 <https://www.humboldt-innovation.de/projects/HumboldtInnovation/static/custom/file/HI-Jubilaeum-2015.pdf>

52 This could be done via tax-free donations or by buying shares in such companies.



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In the most optimistic scenario, several V4 universities could join forces and establish one organization with the mission to promote regional collaboration and enhance the potential of academia-business cooperation. We believe such an organization could evolve into a “R&D bank.” This “bank” could serve as an intermediary between researchers and business. We imagine two possible jobs for such an institution:

1. acquiring intellectual property (“IP”) from researchers for a fixed fee, with potential variable upside after the IP has been resold to the private sector,
2. “lending” IP, i.e., transferring the “ownership” of an IP for a pre-determined period, with an option to prolong and potential to grant it to more than one user.

In the first case, the researchers would receive additional funding (although low) early, which could allow them to continue their research. If an IP could be granted to more than one user, and/or the value of the IP can, foreseeably, grow quickly over time, the “bank” could transfer it temporarily and receive a fee. We hope this could prevent the so-called “patent wars”, i.e., companies acquiring IP to hinder their competitors from using it.

Finally, we would encourage V4 governments to allow universities to establish venture funds at universities. These funds, run by professional venture capitalists, should be mandated to invest in the university spin-offs on a market basis. They could be established as part of the “venture services” provided by the technology transfer centers mentioned above or exist independently. We propose to make those funds evergreen, i.e., allow proceeds from successful sales of businesses to refuel the funds and refrain from fixing the funds’ lives.

**Recommendation: Establish evergreen funds at the local universities with a mandate to invest in university spin-offs.**

## 2.5 Capital – how to attract quality capital and financing for entrepreneurs?

Thirteen unicorns, i.e., companies estimated to have exceeded the value of USD 1 bn, emerged in Europe between January and May 2015. The United States produced 22 unicorns. However, the total value of all unicorns in Europe has been estimated at USD 120bn.<sup>53</sup> This is not even close to market capitalization of Facebook, a single company with a market cap of more than USD 300bn.<sup>54</sup> Research shows building a unicorn company takes approximately USD 140mn in investment.<sup>55</sup> The majority of European unicorns received investment from 5 to 8 institutional investors to date. Only 10% have raised more than USD 300mn, while 20% have raised less than USD 50mn. This indicates the vast majority of very successful companies need funding in the range between \$50m and \$300m.

Some authors<sup>56</sup> argue the state is the only “entity” able to take the risk of financing early stage innovation that may be “the next big thing.” They refer to the role governmental support played in launching Silicon Valley, where several companies were spun out from Stanford University in the 1950s to develop microwave technology for the Cold War under government contracts, followed by government-sponsored projects around spy satellites and ballistic missiles in the 1960s.

We argue that our countries should not look to public money to fund breakthrough innovations. Due to an economic crisis, lack of public money forced many governments to maintain running expenses to the detriment of long-term development goals. To avoid this financing gap, we should focus on creating the private market for financing innovative, yet untested ideas. Even in the early days of the Silicon Valley, it was also private capital that helped finance new ventures. Consider, for example, Frederick Terman, the dean of Stanford’s Engineering School, who directly assisted in financing Hewlett-Packard in 1938.

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53 GP.Bullhound, „European Unicorns: Do They Have Legs?”, June 2015

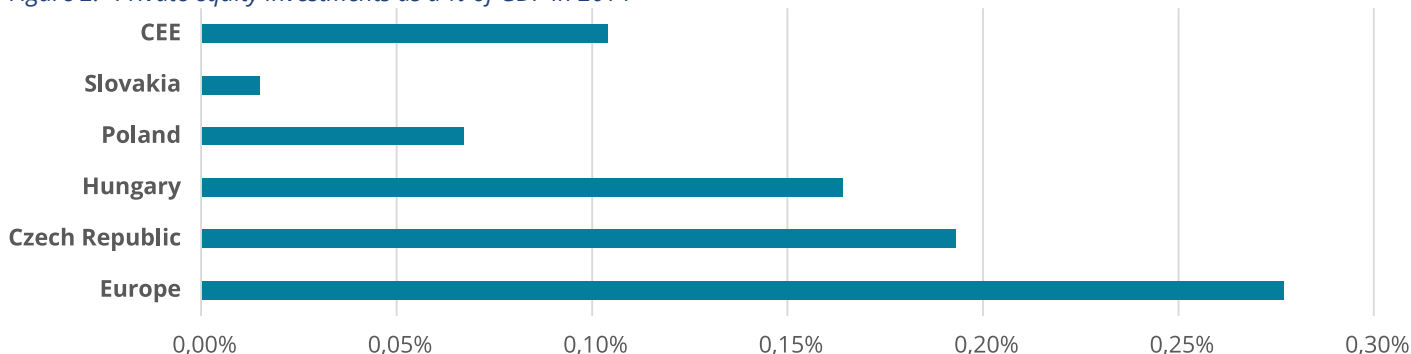
54 As per April 13th 2016.

55 DEPENDENT TECHNOLOGY RESEARCH EUROPEAN BILLION DOLLAR COMPANIES 2015 European Unicorns: Do They Have Legs?

56 Mazzucato, M., The Entrepreneurial State: Debunking Public vs. Private Sector Myths, 2013





Venture capital is a subset of private equity. Venture capital firms are professional managers of risk capital. They aim to support the most innovative and promising, yet untested, business ideas. Venture capital firms acquire ownership stakes and help companies grow in exchange. The money is made on existing investments that become more valuable over time.

Figure 2: Private equity investments as a % of GDP in 2014<sup>57</sup>



The value of venture investment in CEE rose by 38%, with all venture sub-segments increasing in 2014. The most notable rise was observed among companies receiving start-up funding, with 106 companies financed. Hungary and Poland are regional leaders and account for combined 55% of total CEE venture investments.<sup>58</sup> Across the CEE region, the VC sector accounted for 7% of total private equity investments by value, but 72% by number of companies backed. We have to note that 2014 was a record year in terms of VC investment activity, with USD 86.7bn invested in 6507 deals globally.<sup>59</sup>

Table 1: Type of investment by CEE country in 2014 (no bank leverage included)<sup>60</sup>

				
Amounts in EUR ('000)	Czech Republic	Hungary	Poland	Slovakia
<b>STAGE</b>				
Seed	0	1 496	1 820	800
Start-up	2 933	22 174	9 722	900
Later-stage venture	6 134	8 477	10 472	3 000
<b>TOTAL VENTURE</b>	<b>9 067</b>	<b>32 146</b>	<b>22 014</b>	<b>4 700</b>

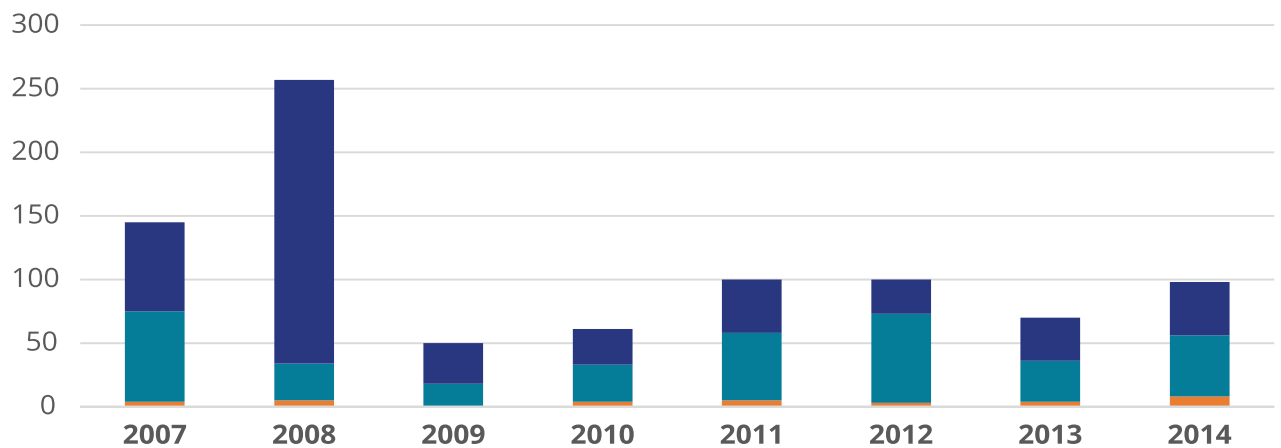
Despite the growth of the CEE venture capital market, it has not reached its pre-2008 levels. Also, the CEE share of European venture investment value was merely 2,7% in 2014; however, it has grown by 0,6 percentage points, with 2,1% in 2013.

<sup>57</sup> European Private Equity and Venture Capital Association, EVCA Central and Eastern Europe Statistics 2014, August 2015

<sup>58</sup> European Private Equity and Venture Capital Association, EVCA Central and Eastern Europe Statistics 2014, August 2015

<sup>59</sup> EY, Venture Capital Insights 4Q14, Global VC investment landscape, January 2015

<sup>60</sup> Adopted from European Private Equity and Venture Capital Association, EVCA Central and Eastern Europe Statistics 2014, August 2015



■ Later-stage	70	223	32	28	42	27	34	42
■ Start-up	71	29	18	29	53	70	32	48
■ Seed	4	5	0	4	5	3	4	8

61

Let us compare the European Union to the United States. In the US, the venture capital investments represented 0.3% of GDP in 2014, compared to 0.02% of GDP in Europe (which represents a 60% decrease in nominal terms from 2008).<sup>62</sup> Silicon Valley may have over three times as many early stage tech investors as Europe.<sup>63</sup> It means there are more funds available for creating companies in the US. According to a recent study conducted in Poland<sup>64</sup>, 55% of start-ups want to partner with a venture investor.

### Case study: India

Venture capital industry in India has come a long way. Its modern origins can be traced to the setting up of a Technology Development Fund in the years 1987-1988, with the aim to provide financial support to innovative and high-risk technological initiatives. By that time, venture capital received official recognition. In 1991, thanks to economic liberalization<sup>65</sup>, India became more open to foreign investors. Then, several reforms were introduced by the government, looking for ways to attract FDI in India. These reforms included the elimination of multiple overlapping regulations referring to VC, introduction of a tax pass (tax neutrality) for venture assets, expansion of the number of domestic institutional investors permitted to commit funds to venture vehicles, or augmentation of the IPO requirement to present a three-year track record of bank financing to include companies funded by the registered VC funds.<sup>66</sup> The availability of venture capital increased sharply, especially after 1998, following the Internet bubble, but it did not stop there.

The VC investment in India reached USD 5.2bn in 2014. This amount rose by 49.3% CAGR between 2009 and 2014!<sup>67</sup> Much of this growth was driven by foreign investors. Many were attracted to a growing capital market. In September 2008, just before the beginning of the financial crisis, there were almost 5000 companies traded on the Bombay Stock Exchange, with over 200 IPOs over the previous 2.5 years. Between 2008 and 2014, more than USD 850mn (in nominal terms) was raised by VC-backed companies through IPO exits in India, over USD 100mn more than in Israel.<sup>68</sup>

One of the most compelling success stories was the investment made by Warburg Pincus. Between 1999 and 2001, this global private equity investor acquired 18% of Bharti Televentures, an Indian mobile telephony firm, for USD 292mn. By the time the investment was made, Bharti had a market capitalization of USD 100mn. The company used the money to expand its operations. By the time Warburg Pincus exited the investment (2005), Bharti's market cap was USD 15bn. Experts estimate Warburg's realizations at USD 1,6bn.<sup>69</sup>

61 European Private Equity and Venture Capital Association, EVCA Central and Eastern Europe Statistics 2014, August 2015

62 [http://www.eif.org/news\\_centre/publications/tackling-smes-asymmetric-risk-the-eib-approach.pdf](http://www.eif.org/news_centre/publications/tackling-smes-asymmetric-risk-the-eib-approach.pdf)

63 <http://www.businessinsider.com/white-star-capital-on-early-stage-funding-gap-in-europe-2015-11>

64 Polskie Startupy Raport 2015

65 E.g. removal of the minimum size of VC funds, relaxation of permission procedures, etc. For more see: Bowonder, B., Mani, S., Venture Capital and Innovation: The Indian Experience, available at: <http://www.insme.org/files/148> (accessed on April 17th 2016).

66 Bowonder, B., Mani, S., Venture Capital and Innovation: The Indian Experience, available at: <http://www.insme.org/files/148> (accessed on April 17th 2016).

67 EY, Venture Capital Insights 4Q14, Global VC investment landscape, January 2015

68 EY, Venture Capital Insights 4Q14, Global VC investment landscape, January 2015

69 This story has been adapted from Lerner, J., The Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital have Failed – and What to Do About It, 2009, and was in turn based on Hardyman, F., Leamon, A., Motilal Oswal Financial Services – an IPO in India, Harvard Business School Case (2007): no. 9-807-095; and Fang, L., Leeds, R., Warburg Pincus and Bharti Tele-Ventures, in "The Globalization of Alternative Investments: Working Papers", Gurung, A., Lerner, J. (eds.), World Economic Forum, 2008, Geneva, p. 151-163

Table 2: Phases of Growth of Indian Risk Capital<sup>70</sup>

	PHASE I	PHASE II	PHASE III	PHASE IV
	PRE-1995	1995-97	1998-2001	2002-2005
Total Funds (in USD mn)	30	125	2 847	5 239
Number of Funds	8	20	50	75
Primary Stages and Sectors	Seed, Early-stage and Development - Diversified	Development - Diversified	Early-stage and Development - Telecom & IT	Growth/Maturity - Diversified
Primary Sources of Funds	World Bank, government	Government	Overseas institutional	Overseas Institutional
Total Number of Transactions	30	65	548	446
Average Investment (USD mn)	1	2	5,20	11,75

Plenty of arguments supports our vision. **First**, venture funding has a strong positive impact on innovation. A dollar of VC funding appears to stimulate patenting 3 to 4 times stronger than a dollar coming from corporate R&D. What is more, the patents of venture backed firms are more frequently cited and more aggressively litigated, hence, perceived as higher quality than their peers.<sup>71</sup> **Second**, venture capital has relatively low impact on developed industries, because its success is based on capitalizing on revolutionary changes. Therefore, it does not threaten mature businesses if they are not affected by an industry disruption supported by VC. **Third**, the presence of venture capital might reduce the time taken to bring a product (especially an innovative one) to market.<sup>72</sup> **Fourth**, venture market is temporary by nature, as venture funds are typically required by investor agreements to exit their investments within a certain timeframe (e.g. 3-5 years). Therefore, we should not be worried about foreign investors “expropriating” us of our crown jewels. Instead, we should encourage them to “validate” the market by investing in local companies. Many of recent success stories, such as Israel and Singapore, experienced a major boost from global players, while building their venture markets.

How can we build a hefty venture capital market in our region? We should focus on the following areas:

- expanding potential investor base
- providing exit options,
- supporting capital providers.

### 2.5.1 Expanding potential investor base

A plentitude of options have been used. A good example of a supportive initiative was the relaxation of Employment Retirement Income Security Act restrictions in 1979 by the US Labor Department. It allowed corporate pension funds to invest in venture capital. As a consequence, pension funds became the prime funder of VC, rising from USD 100-200mn per year in the 1970s, to over 4bn at the end of 1980s. According to the National Science Board, by 1989, the capital managed by venture capital firms totaled nearly USD 33.5bn, up from USD 4.1bn in 1980.<sup>73</sup> Based on the data collected by the National Venture Capital Association, over 40% of this amount has been provided by pension plans. Other options worth mentioning include lowering the capital gains tax, as already suggested before.<sup>74</sup>

### 2.5.2 Providing exit options

One of the greatest fears of venture capitalists, especially in the emerging markets, is their investments will be difficult to exit. The possibility of an exit, especially via public markets, is also important to entrepreneurs, because they value independence and, usually, perceive VC investors as temporary sharehold-

70 Surineni, S.K., Venture Capital and Private Equity in India: Systems Analysis and Development Framework, MIT, 2012 p.15

71 Lerner, J., The Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital have Failed – and What to Do About It, 2009, p. 62

72 Hellmann, T., Puri, M., The Interaction between Product Market and Financing Strategy: The Role of Venture Capital, Review of Financial Studies 13, 2000, p. 959-984

73 <http://www.nsf.gov/statistics/seind02/c6/c6s6.htm>

74 Kenney, M., Florida, R., Venture Capital in Silicon Valley: Fuelling New Firm Formation “Understanding Silicon Valley: the anatomy of an entrepreneurial region”, M. Kenney, Stanford University Press, 2000, p.98-123

Rao, A., A history of Silicon Valley: The Greatest Creation of Wealth in the History of the Planet”, 2013, 2nd edition

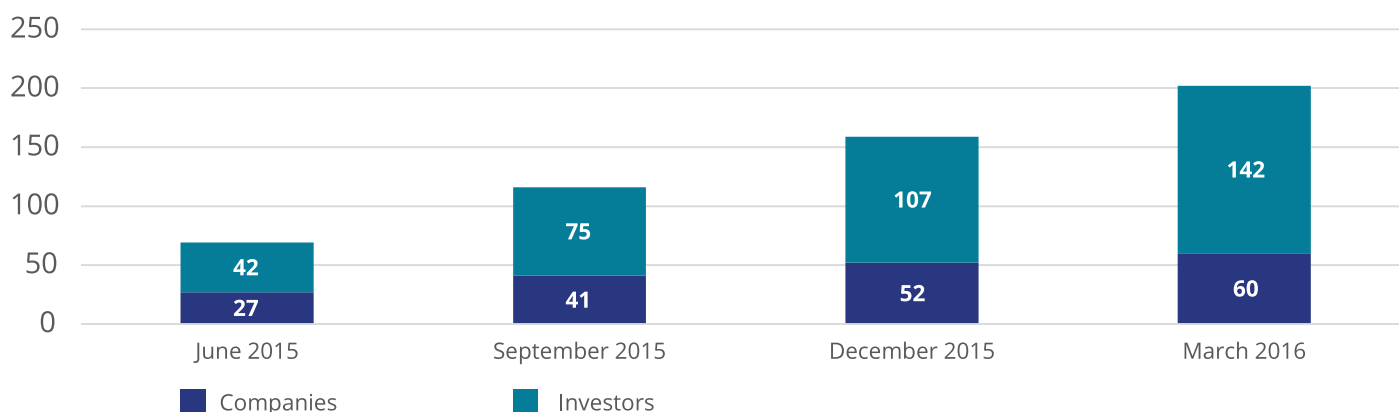
ers.<sup>75</sup> In recent years, the most favored exit option were trade sales and sales to management. In 2014, these both accounted for 63% of venture-backed companies that exited in CEE. None of the 2014 VC exits occurred via an initial public offering.

Amounts in EUR ('000)	Amount	Number of companies	Amount	Number of companies
Trade sale	4 118	6	24 728	6
Public offering	7 677	3	1 400	1
IPO	0	0	0	0
Sale of quoted equity	7 677	3	1 400	1
Write-off	1 168	4	1 520	2
Repayment of principal loans	0	0	1 076	3
Sale to another private equity	4 000	1	0	0
Sale to financial institution	5 272	3	7 250	1
Sale to management	23 465	10	5 237	6
Other means	0	0	0	0
<b>TOTAL</b>	<b>45 699</b>	<b>26</b>	<b>41 212</b>	<b>19</b>

There might be several possible explanations of this phenomenon. For instance, the valuations might not have been attractive, or the companies were not yet ready to sell their stocks. However, other possible explanations include: lack of adequate offer for young firms, lack of know-how required to conduct a public offering, or lack of liquidity and trust in our stock exchanges (and their environment). We hope this is not the case, because – as research suggests – the number of IPOs affects the amount of venture capital invested, especially in later-stage investments.<sup>76</sup> To remain competitive, our regional stock markets should consider all these scenarios.

The same idea seems to have guided Deutsche Börse, when it launched the “Deutsche Börse Venture Network” Program in June 2015. The Program aims to improve funding opportunities for young growth companies. Venture Network comprises a non-public online platform, where funding rounds will be initiated, with training and networking events. To qualify, companies must meet selection criteria (certain revenue, revenue growth, and/or annual net profit requirements). The platform, resembling equity-crowdfunding solutions, might **offer both a primary and secondary market for offerings online.**

Figure 3: Number of DBVN participating investors and companies



75 This notion goes back to the work done by Gilson and Black, who showcased that venture capital has greater vitality in stock market-centered systems. Gilson, J., Black, B.S., „Venture Capital and the Structure of Capital Markets: Banks versus Stock Markets”, Journal of Financial Economics 47, 1998, 243-277

76 Jeng, L.A., Wells, P.C., The Determinants of Venture Capital Funding: Evidence across Countries, in: Journal of Corporate Finance, 6, 2000, p.241-289

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Deutsche Börse Venture Network has been quite successful so far, attracting over 140 investors and 60 companies in 9 months since it started operations. The Budapest Stock Exchange (“BSE”) is also waging a similar project and aims to proceed with the specifics in the first half of this year. The candidate companies would have to enter into an agreement with the BSE and provide certain information prior to being eligible for the platform. Transactions between investors could be concluded as an auction or 1-on-1 negotiations.

This should not be a surprise. The market for alternative finance (including equity-based products) has grown, with an average yearly growth rate of 146% between 2012 and 2014. It was estimated to be worth nearly EUR 3bn in 2014.<sup>77</sup> Equity-based crowdfunding reached EUR 47.45mn in 2013 and EUR 82.56mn in 2014, which seems like nothing, compared to the total European early-stage investment market (worth EUR 7.5bn in 2013<sup>78</sup>). However, equity crowdfunding is growing fast, with a 116% average growth in the last 3 years. To summarize: crowdfunding grows rapidly and might, at one point, disrupt the business of stock exchanges. Missing out on this opportunity might have disastrous effects to our local capital markets. The venture capital industry is driven by a continuous pipeline of investment opportunities that promise significant returns. These platforms may serve as a stream of promising businesses that could help us build and sustain the venture capital market.

**Recommendation: We recommend other V4 countries to follow suit. A platform like Deutsche Börse Venture Network is a chance to educate companies, expand the local VC investor base, and prepare an exit market.**

### 2.5.3 Supporting capital providers

Building friendly ecosystems for capital providers requires understanding their needs and challenges. Policymakers often try to support businesses, making decisions based on incomplete information. As one study determined, 49 of 50 U.S. states started programs to promote certain industry, hoping to create a cluster of activity, but only a handful succeeded.<sup>79</sup> Having this in mind, we would encourage public bodies, regulatory offices, especially, to work closer with the business world. One way to do this is the already mentioned Innovation Hub in the United Kingdom. Another great idea is a public consultation online platform, launched recently by the Start-up Poland Foundation in cooperation with the Polish Ministry for Development. One way or the other, building a robust venture capital market requires a **lasting commitment by public officials**. Immediate returns should not be expected, and initial failures should not work as discouragements.

## 2.6 Networks – how to support mechanisms of sharing experience and resources?

According to Linda Rottenberg – co-founder of Endeavor and one of TIME’s 100 “Innovators for the 21st century” - the best incubator for entrepreneurship occurs when entrepreneurs form close networks and nurture fellow risk-takers with their experience and resources.<sup>80</sup> Networks are powerful because of their ability to achieve more than one entity could do alone. Their value lies in diversity. A diverse network of people with expertise in different disciplines and the ability to solve various problems attracts more talented people in a self-reinforcing virtuous cycle.

### Case study – the Rust Belt

The Rust Belt (formerly known as the “Manufacturing Belt”) is a term used to describe the oldest and the biggest industrial region in the United States. It encompasses the upper Northeastern United States, the Great Lakes, and the Midwest States. The term “Rust Belt” has become a synonym to economic decline, loss of population, and urban decay due to hardships of a once powerful industrial zone. Let us look at two

77 Zhang, Z., Wardrop, R., Rau, P.R., Gray, M., Moving Mainstream. The European Alternative Finance Benchmarking Report, February 2015

78 EBAN, The European Trade Association for Business Angels, Seed Funds, and other Early Stage Market Players – Statistics Compendium for 2014

79 Feldman, M. P., Francis, J.L., Fortune Favors the Prepared Region: The Case of Entrepreneurship and the Capitol Region Biotechnology Cluster, in: European Planning Studies, no. 11, 2003, p. 765-788

80 <http://knowledge.wharton.upenn.edu/article/making-entrepreneurship-contagious/>



towns in the Rust Belt area: Youngstown and Allentown. Both had similar demographics and economic structures and fell prey to the declining steel industry. The difference was, while Youngstown was ruled by highly intertwined elites that wanted to isolate their city from any economic changes that could question the status quo, Allentown had looser networks that enabled nurturing relationships across social and political lines. Some researchers suggest Allentown better managed to bounce back from the downturn because of that: it had individuals and organizations that served as bridges between various groups that needed to be engaged in the region's recovery.<sup>81</sup>

It is hard to replicate a particular alchemy of networks, as all sorts of different actors are needed to create it. Every actor and every interaction could both reinforce the network and end it. There are, however, several factors that could support building a well-functioning entrepreneurial collaboration system.

### 2.6.1 Creating an open environment

Successful entrepreneurial networks are open environments. The culture of openness attracts top human resources and causes a brain drain in other parts of the world, mainly because systems of easy information exchange and job-hopping allow people to pursue new ventures faster. Let us take Silicon Valley as an example. Over 50% of Silicon Valley's companies are founded by immigrants, not "local talent".<sup>82</sup>

**Recommendation: V4 countries must work on removing barriers for people who want to work and study abroad and, simultaneously, attract global talents to come to work and study in our countries.**

This recommendation, however, has to be read in conjunction with the next point.

### 2.6.2 Embracing interdependencies and creating sharing mechanisms

Over the years, people who used the opportunity to pursue a cutting-edge experience abroad tend to get involved in ventures in their native lands as financiers, advisors, or local entrepreneurs. A network of expatriates is an important source of new ideas and capital for ventures. **Consider, for example,** the Hsinchu-Taipei region of Taiwan. It is perceived as one of the most cited success stories, regarding entrepreneurial hubs. Much of its prosperity might be attributed to a decentralized process of reciprocal transfers of capital, skill, and know-how of Taiwanese talent taught at the best universities in the world.

#### Case study – Chinese Institute of Engineers

In 1979, a group of Taiwanese immigrants in San Francisco started a local branch of a New York-based organization - Chinese Institute of Engineers ("CIE"). The aim was to promote communication and cooperation among the region's Chinese engineers. In its early days, CIE was based on pre-existing social ties. The first meetings were focused on helping members find a job or start a business. As the organization grew, previous generations of CIE members became role models for the newcomers. But this was just a beginning. The Institute quickly surpassed its NY headquarters to become the largest of its kind in the US. In following years, Taiwanese immigrants established various technical and business associations.<sup>83</sup> All these organizations shared the same feat: they simultaneously fostered ethnic identities and facilitated professional networking and information exchange. People of CIE integrated into the international community. Many regularly return to Taiwan for technical seminars sponsored by government agencies or professional associations, like the CIE. The density of network dramatically accelerates the exchange of know-how, skill, and information.

81 For more see Safford, S., *Why the Garden Club Couldn't Save Youngstown: The Transformation of the Rust Belt*, 2009

82 Saxenian, A. L., *Local and Global Networks of Immigrant Professionals in Silicon Valley*, Public Policy Institute of California, San Francisco, 2002

83 For instance, the Chinese American Semiconductor Professional Association, or the North American Taiwanese Engineers Association.



Another great example is India – a country with a diaspora estimated to have totaled 18mn people in 130 countries by 2007.<sup>84</sup> According to research, 2/3 of the Indian-born entrepreneurs working in Silicon Valley advised entrepreneurs in India, and 18% invested in Indian-based firms.<sup>85</sup> As research suggests, cross-border social networks play an important role in helping entrepreneurs to overcome the barriers arising from imperfect domestic institutions in developing countries.<sup>86</sup>

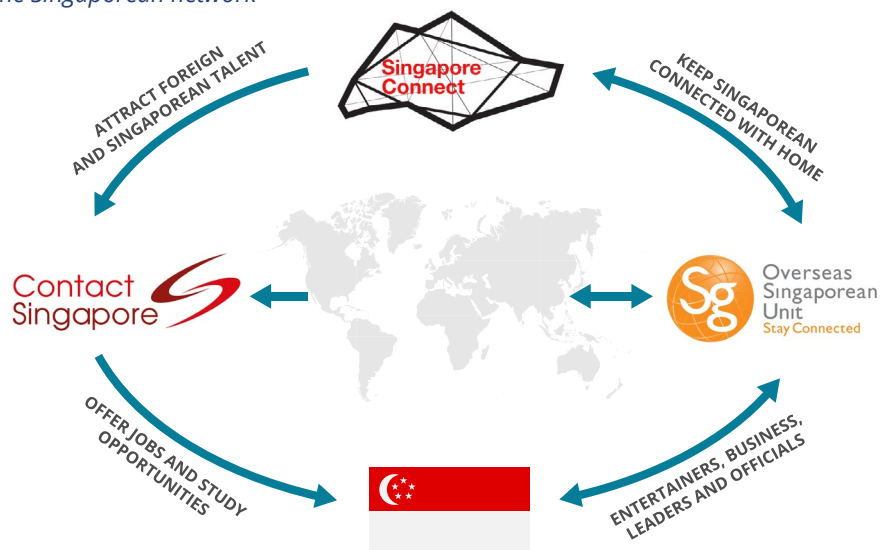
Among efforts employed by other countries, it is worth mentioning the establishment of “connect@sg”, a voluntary, non-profit Singaporean initiative, which sought to contact Singaporeans expats and connect them with native entrepreneurs. The initiative launched in 2000 and is still operational. The organisation, now known as Singapore Connect, runs several events, only some “professional.” Until 2008, it received annual funding from the Singapore International Foundation, but since then, money comes from donations, registration payments, and occasional sponsorships or grants. On these fundamentals, the Singaporean government has built several initiatives and organisations to reconnect the Singaporean expats with their country.

Table 3: Selected organisation supporting Singaporean overseas<sup>87</sup>

Organisation	Overseas Singaporean Unit	Contact Singapore	Consulate General	Singapore Connect
Focus	Help overseas Singaporeans stay in touch with Singapore via newsletters and discount passes, bringing Singaporean entertainers and speakers to your city, and major events, like Singapore Day.	Help connect foreigners and Singaporeans to job and study opportunities in Singapore.	Help overseas Singaporeans renew their passport, help if they need special assistance, and process visas for foreigners	Help Singaporeans and friends staying in each overseas city connect over social and business events, like potlucks, dinner functions, sports, and family gatherings
Supported by	Prime Minister's Office	Economic Development Board	Ministry of Foreign Affairs	Local Singaporeans around the world
Funding	Taxpayer money	Taxpayer money	Taxpayer money	Local support, grants, and sponsorships

While Overseas Singaporean Unit and Contact Singapore seek to link the government in Singapore to people overseas and people who wish to study or work in Singapore, SingaporeConnect works on a more casual basis. We believe these organizations complement each other in building a successful network. It is important to remember that people who run successful organizations will not join a network because somebody orders them to. They have to feel the need to join and know that participating is helping them make progress toward a shared goal. That is why these different ties should be supported.

Figure 4: Dynamics of the Singaporean network



84 Nanda, R., Khanna, T., *Diasporas and Domestic Entrepreneurs: Evidence from the Indian Software Industry*, Harvard University, 2009  
 85 Saxenian, A. L., *Local and Global Networks of Immigrant Professionals in Silicon Valley*, Public Policy Institute of California, San Francisco, 2002  
 86 Nanda, R., Khanna, T., *Diasporas and Domestic Entrepreneurs: Evidence from the Indian Software Industry*, Harvard University, 2009  
 87 Adopted from: <http://www.singaporeconnect.org/pages/about-us>

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We think it is necessary to build a local organization(s) to reconnect our expats with their home countries. Such an organization could be built on the example of Contact Singapore, on a per country basis, or as an alliance between several Ministries. It is in our best interest to engage global talent to **work, invest, and live in the Visegrad countries**. Knowing that a plethora of our local problems stretch locally, we could use this platform to exchange know-how and help our enterprises go international from the beginning. In order to cement the network, our countries should support the establishment of informal, decentralised networks around the world, especially in the best entrepreneurial hubs.

**Recommendation: Attract expats, global talent and investors by building a professional network organization, e.g., “Contact Visegrad”. Support local informal networks, e.g., with grants and donations.**

## 2.7 Culture – how to spur a culture that embraces both successes and failures?

There have been many attempts to replicate the success of the Silicon Valley, but nearly all of them have failed. We believe the reason lies in ignoring the intertwined character of features that make an entrepreneurial ecosystem successful, its **culture**.

### Case study: New Jersey

New Jersey is one of the leading high-tech centers in the US, home to the laboratories of over 700 companies (including giants, like Johnson&Johnson, Merck, Bayer. or Bristol-Myers Squibb) and over 50 000 science and engineering workers. As a former home to both Thomas Edison and Albert Einstein, it has a rich history of scientific research. The geography also seems advantageous – New Jersey is situated close to Philadelphia and New York City. Because of time zones, people can communicate with both California and Europe in the same day. It has renowned universities, like Princeton, Rutgers, or the New Jersey Institute of Technology, to name few. Since the 1960s, New Jersey has continuously attempted to become the next Silicon Valley. It put together a consortium of local research organizations and hired Fred Terman, the Stanford University dean, credited for creating Silicon Valley. Although New Jersey had the greatest concentration of engineers and scientists in the US, Terman’s idea was to establish a new graduate university, with enough credibility to recreate the Silicon Valley’s culture of innovation. But neither the industry nor the academia wanted to collaborate on this project. Big drug firms did not want to reveal their research to the public, and other leading companies did not want to share their best researchers with universities. The culture of the East Coast favored academic publications, instead of entrepreneurship. The consortium established to execute Terman’s ideas fell apart, and there was no new university, nor the new Valley.

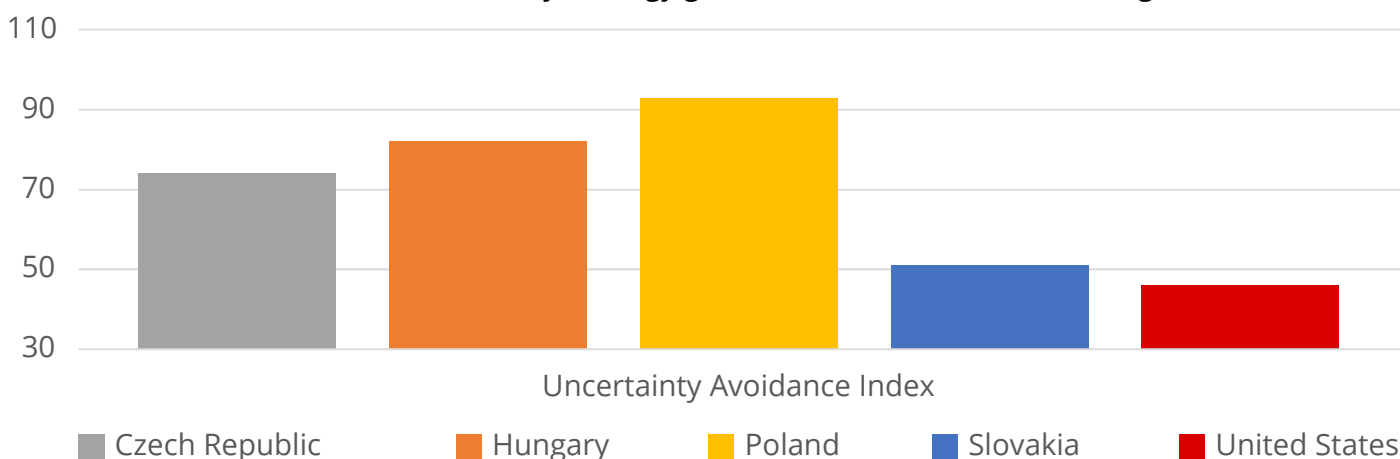
There are many other examples of how government-led initiatives produce lackluster results. Consider, for example, the Kuala Lumpur based BioValley, where a USD 150mn project incubated only a handful of biotech companies. Look at USD 40mn injected into over 800 start-ups in Chile, of which almost 80% have moved to the Silicon Valley or New York City. Imagine USD 2bn spent for a start-up hub in Moscow, without a groundbreaking success. But why is this so?

We believe the “glue” for all required components is the powerful culture that drove Silicon Valley during its growth. It is a culture that supports experimentation and risk-taking, a culture that, as we already described, developed mechanisms of sharing both good and bad experience. It is a culture of close ties between local universities and startups. This culture encourages job-hopping and absence of legal and social barriers. Silicon Valley’s culture means competing and collaborating, at the same time. Such a culture is hard to nurture and takes time to build.

As you can see, we perceive culture as an **act of balancing many elements of the entrepreneurial hub** described above. It comprises many small actions that, when put together, create something larger than the sum of its parts. We believe the act of sparking this culture must start with inculcating a set of beliefs that make entrepreneurship a **valid and respected career choice**. A study conducted by

EY in the G20 countries showed 84% of entrepreneurs were of the opinion that **raising awareness of entrepreneurs' role** as job creators would significantly improve attitudes to entrepreneurship.<sup>88</sup> This could be done by following our recommendations in “education.”

Another point raised in the EY study was the view of 67% of entrepreneurs that business failure is a negative experience, rather than a way to get better. We have already indicated how important it is to **remove the stigma of failure**. We want to stretch it and say that risk, **especially the risk of failure, is inherent** in any business activity. We have to learn to **deal with it** in a way that does not discourage next generations of entrepreneurs to face it. This is important, because our countries do not deal well with anxiety. Our countries (except for Slovakia) score high on the Hofstede's Uncertainty Avoidance Index. Countries exhibiting high uncertainty avoidance are mostly intolerant of unorthodox behavior and ideas. In these cultures, security is important and innovations may be resisted. Even worse – when potential entrepreneurs, especially highly talented people with many career options see the efforts of their colleagues who chose to be entrepreneurs fail, they choose safer paths. How can countries, like ours, succeed in a world, where the only strategy guaranteed not to fail is not taking risks at all?



In our opinion, it could be achieved by mobilizing regional role models to participate in events and campaigns that promote the entrepreneurial way of life. These people inspire and attract new generations of successful entrepreneurs. They should emphasize the benefits of entrepreneurship, from innovation to creation of jobs and broader economic prosperity. They have to demystify the art of failing and getting through the hard times, because, after all, we all have failed in our lives. If we could create confidence and optimism among talented people in the V4 region, these people might succeed beyond their wildest dreams!

**Recommendation: Showcase successes and failures. Teach to embrace and deal with risks.**

## 2.8 Closing remarks

Visegrad Valley, a place between mature Europe and the “Wild East”, is a mix of two worlds that successfully transformed from communism into capitalism. Now, it looks up to its entrepreneurs and leaders, who are not afraid to dive deep into the unknown and stand as role model for bold economic development. On its course to shape the future, it will need help with institutional voids, political resistance, knowledge, and financial gaps. To overcome those challenges and create the Visegrad Valley, the Visegrad countries will need help from all stakeholders. Having heeded the lessons of recent decades of transformation, the first steps on the path to future prosperity have been made. We hope we can lead our countries into the next 25 fruitful years.

<sup>88</sup> The EY G20 Entrepreneurship Barometer 2013

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## 3. THE FUTURE OF FINANCE

Damian Polok, Sebastian Wieczorek, Dominik Keil, Zsombor Incze

### 3.1 Executive Summary

A stable financial system is crucial for the success of any economy. Looking at the future of V4, without doubt, the expanding economies will also require larger and more sophisticated access to finance. For this progress it is necessary to create an appropriate macroeconomic framework that would appeal to short- and to long-term investors. This framework should be characterized by prudent fiscal and monetary policy, appropriate and predictable legal and political framework, and a pro-investing political climate. With an overall positive environment for capital markets, Visegrad would benefit in the long-term.

- 1. Create a long-term V4+ capital market development plan.** In order to promote development of our fragmented capital markets, our countries should engage in strategic partnerships and collaborate to increase the attractiveness of the region. Capital markets and stock exchanges increasingly focus on cross-border integration. Successful examples show that long-term development plans engage strategic partnerships of the financial eco-system as a whole. To create a deep and liquid capital market, governments, stock exchanges, regulators, and market participants of our region have to cooperate to create a long-term investment-friendly framework, which would direct to an advancing synchronisation and integration – possibly to the point to create a single capital market.
- 2. Put capital markets in a central role.** The financial sector in Europe is bank centric. Companies from our region should attract long-term financing of their expansionary and innovative activities. For a long-term development strategy, it will become crucial to develop well-functioning capital markets, which will enhance the funding-mix of the economy, give access to capital to innovative companies and attract other market participants, which will find better opportunities to invest and disinvest, like Private Equity funds. Companies from our region should have the opportunity to attract long-term financing of their expansionary and innovative activities. A clear commitment towards capital market financing, including alternative sources of finance, of our governments is inevitable.
- 3. Increase role of domestic capital by deepening the local investor base.** V4's capital markets are bank dominated. Compared to developed capital markets, investment and pension funds and other (institutional) financial service providers play a minor role. Regulatory frameworks shall be constructed to encourage local investments in capital markets, rather than discourage, like the reversal reforms of private pension funds in Hungary and Poland. Additionally, V4's banking sectors are dominated by foreign banks. We believe with increasing development of the economy, the banking sectors will also resemble the banking structure of more developed economies to a much higher extent. This includes a higher ownership of the banking system by local capital.
- 4. Increase diversification of sources of funding.** By expanding the role of the capital market, regulators should enable diversified sources for investments. It is important to allow for products that in other, more developed capital markets are used and give fuel for the realisation of needed investments. REITS, securitisation or Islamic Finance, as examples, have so far not been implemented across the whole of V4, yet could be another step towards increased synchronisation of the capital markets and improved reputation in the eyes international investors. The increased attractiveness of the region would in consequence lead to expanded fields of activity for domestic investors as well, as increased market activity reinforces further activity benefiting from improved liquidity,

## 3.2 Stability of the financial sectors in V4 key to further economic development

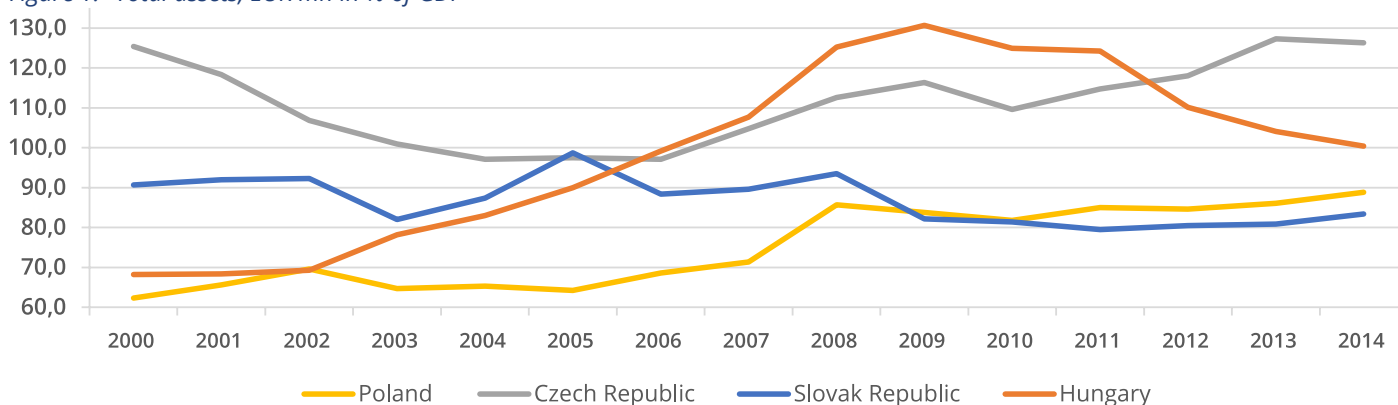
The financial crisis exposed financial instability in the international economy, causing the biggest collapse since the Great Recession. The crisis that broke out in the United States' housing market in mid-2007 rapidly expanded to other sectors of the economy, starting a domino effect<sup>89</sup>.

Since 2007, major central banks, fearing a repetition of the 30s' scenario, have provided liquidity support to the market and in parallel cut interest rates, with aim of increasing market liquidity. In many countries, including the Euro area, governments started to recapitalize banks, which led to rapid growth of budget deficits and public debt. Existing financial institutions were perceived as "too big to fail" (the assets of top 10 banks dubbed most of other euro zone GDPs) soared countries debt causing recession<sup>90</sup>. However, compared to its Western European peers the Visegrad Group experienced a smaller recession, with Poland being Europe's 'green island' with no recession.

While the first phase of the crisis (2007-09) was similar in all developed countries, in years following, some differences between the Europe and the United States became visible<sup>91</sup>. One reason was that crisis undermines weakness of one currency regime. In case of Europe, this resulted in the Euro's three crisis dimensions: 1) banking; 2) sovereign debt; and 3) growth and competitiveness<sup>92</sup>. In the second half of 2014, The Economist called America's economy "The lonely locomotive" in terms of recovering and growth. Additionally, in December 2015, the Federal Reserve raised rates for first time since 2006, which only confirmed the good condition of the US economy. At the same time, the European Central Bank tried to expand its unconventional monetary tools for example the Securities Market Programme and Covered Bond Purchase Programme to support the slender GDP growth.

The V4 countries should take lessons from this experience and revise some of their pre-crisis assumptions, especially pre-existing paradigms of the financial sector and the economy. Before the crisis, many economists (e.g., Ross Levine) thought extensively large financial systems spur economic growth. Some analysis conducted after 2008 suggest there is a threshold above which financial depth no longer has a positive effect on economic growth<sup>93</sup>. Empirical approaches show that financial depth has a negative impact on output growth when credit to the private sector reaches 100% of GDP.

Figure 1: Total assets, EUR mn in % of GDP



Source: Raiffeisen Research, NBP, MNB, CNB, NBS, 2015

Other research showed that Europe is overbanked because of enormously large banks, too much banking credit to GDP, and excessive dependence on banks' lending to the economy<sup>94</sup>. That holds especially true for the countries of V4, as their underdeveloped capital markets constitute, by far less, to the funding mix of their economies than their Western European peers.

89 F. S. Mishkin, Over The Cliff: From the Subprime to the Global Financial Crisis, NBER Working Paper Series, 2010

90 IMF (2009) IMF lowers estimate of losses from global financial crisis and economic crisis to 3.4 trillion US in mid-2007 to 2010. <http://www.globaltimes.cn/content/473710.shtml>

91 T. Hoshi, A. K. Kashyap, Will the U.S. and Europe Avoid a Lost Decade? Lessons from Japan's Post Crisis Experience, 2014

92 J. C. Shambaugh, The Euro's Three Crises, Brookings Papers on Economic Activity, 2012

93 J. L. Arcand, E. Berkes, U. Panizza, Too much finance?, J Econ Growth, 2015

94 Is Europe Overbanked, report written by a group of the ESRB's Advisory Scientific Committee chaired by Marco Pagano, No. 4/June 2014



- Another existing pre-crisis assumption was that the dominance of banks controlled by foreign banking groups in the post-socialist countries is beneficial to their economic development. We should note that banks being part of international groups look at a country's performance, but also their own financial situation, which can cause a negative impact on domestic banks' functioning. This was illustrated during the financial crisis when banks controlled by foreign groups limited corporate credit in comparison with domestic banks<sup>95</sup>.
- The subsequent paragraphs discuss the optimal banking sector structure and its potential influence on V4 economies, the importance of alternative forms of financing and their imminent influence on the future of our economies, as well as the role, development, and future of stock exchanges as foundation for deep capital markets.

### 3.3 Towards an appropriate regulatory framework

The last decades have changed the structure and operations of the financial system, stimulated by significant improvements in technology, rapid product innovation, and ongoing integration of the global financial system. This new environment led to appearance of more sophisticated services and products, which were cornerstones of the global financial crisis<sup>96</sup>. Pre-crisis regulations didn't fit sudden changes that, combined with lack of cooperation between different authorities, led to financial instability. Nowadays, many regulatory initiatives have reshaped the rules that oversee the financial system and systemic important financial institutions<sup>97</sup>.

A well designed and appropriate legal framework is one of the key fundamentals in developing sound and vibrant capital markets. Hence regulators in V4 should follow global best practices, even if their economies, based on their size and level of development, have been less vulnerable to shocks. At the same time our region faces other challenges, like high reliance on foreign capital, hence foreign exchange rate risk, underdeveloped market infrastructure, small investor base combined with marginal liquidity. On one hand, policy makers should remember the continuous changing environment and try to adopt new regulations, but on the other hand, current supervision should be more business friendly. We live in the era of start-ups and growing "alternatives of everything" – financing method (crowd-funding), payment methods (in which FinTech largely contributed), sales channel (mobile devices), communication (online), and this is only part of the current business solution. Regulators should be close to business and include new forms of activities to support them, but also protect consumers. Supervisors and regulators should be guided by a risk-based supervision approach rather than 'blanket regulation', which aims at reducing systemic risk rather preventing individual failures<sup>98</sup>.

Nowadays, capital and labour force are mobile, and there are no contraindications to operate in almost every corner of the world. For all of the Visegrad countries, this situation is an opportunity, but also a potential risk. One of the major resources in our countries are the educated and creative people we have full of ideas. However when pursuing their ideas they often face bureaucracy, complicated tax regulation, high business burdens, unsupportive regulatory framework which causes the best ideas leaving our region. In the next 25 years, V4 countries should implement new regulations to enhance business and innovation growth, and at the same time protect the final consumer. This close-relationship with the business sector can lead us not only to keep current ideas in our countries, but also to attract foreign innovators and capital.

### 3.4 How should the banking sectors of V4 look?

Stable banks are the foundation for successful economic development of our countries. Especially after the financial crisis, it is important to assess the structure of our banking sectors.

95 Report on the optimal structure of the Polish banking system in the mid-term, Capital Strategy, 2012

96 Policy Framework for Effective and Efficient Financial Regulation, OECD 2010

97 Key Aspects of Macroprudential Policy, IMF, 2013

98 Dudley, William C. and Hubbard, R. Glenn (2004); How Capital Markets Enhance Economic Performance and Facilitate Job Creation; Global Markets Institute Goldman Sachs; New York

The basic measure we used to approach the banking market structure was the standardized Herfindahl-Hirschmann Index (HHI), ranging from 0 to 1 (where a value close to one means a monopolistic or at least oligopolistic market structure).

Figure 2: Herfindahl-Hirschmann Index for the Credit Institutions of the V4 countries. Source: ECB data, own visualization.

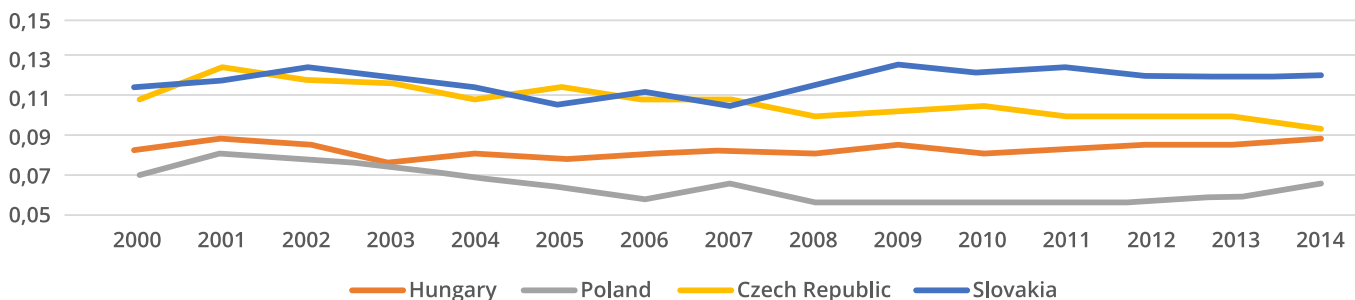
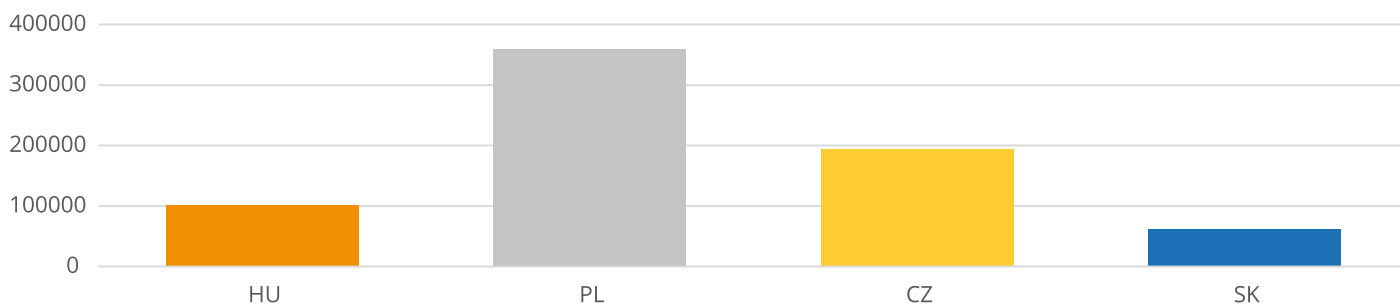
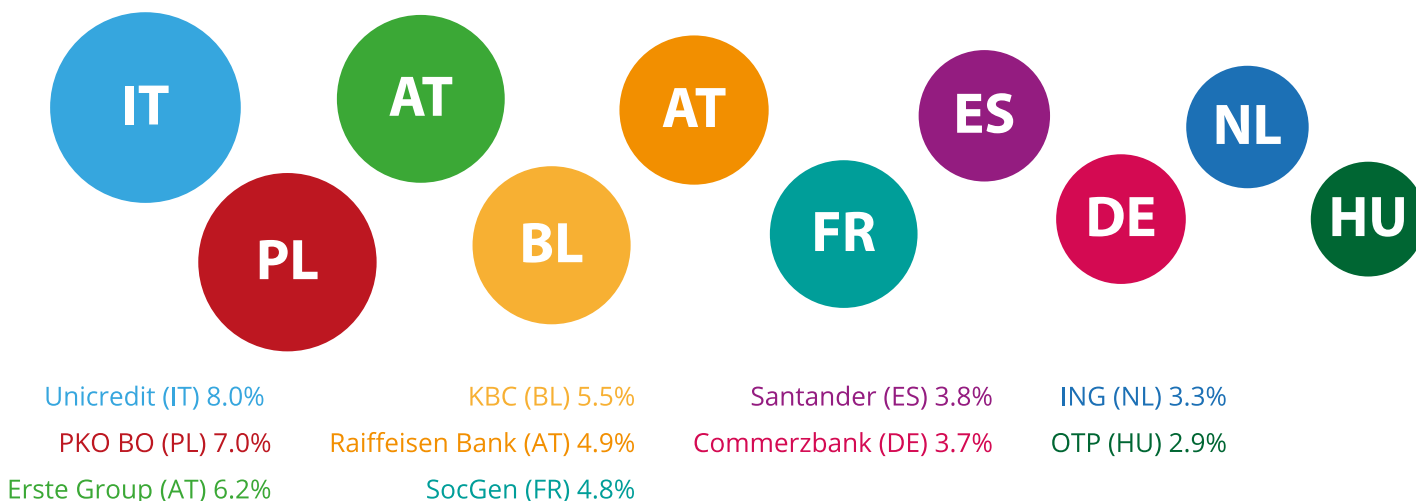


Figure 3: Total assets of the credit institutions in the V4 countries, m EUR., 2014 Source: Raiffeisen Research, 2015



Historically, Slovakia has been characterized by the highest market concentration, which is fair enough, given that Slovakia is the smallest country by market size. On the opposite, Poland has had the lowest HHI. Since 2000, the market concentration in the Czech Republic has been slowly decreasing, while in Hungary, it stayed almost at the same level with some minor changes.

Figure 4: Market Shares 2014 V4 in % of total assets, 2014



According to Raiffeisen Research (2015), UniCredit has the highest market share (by asset size) in the region. Second biggest participant is PKO BP. Apart from PKO, only OTP Bank could get in to the TOP 10 from the region; all other banks originate from outside the region. This creates a unique banking environment, where most lenders are owned and controlled by Western European banks.

In such an environment, this ownership structure contributes to higher lending activity, because these institutions can receive funding from intra-group capital markets, thus, from their parent companies. Jeon et al. (2011) pointed out that foreign banks increase competition. This clearly seems to be the case



in the Czech Republic and Poland, where a clear trend of decreasing market concentration is to be marked out with the countries' deeper European integration. On the other hand, Hungary and, especially, Slovakia do not confirm this finding.

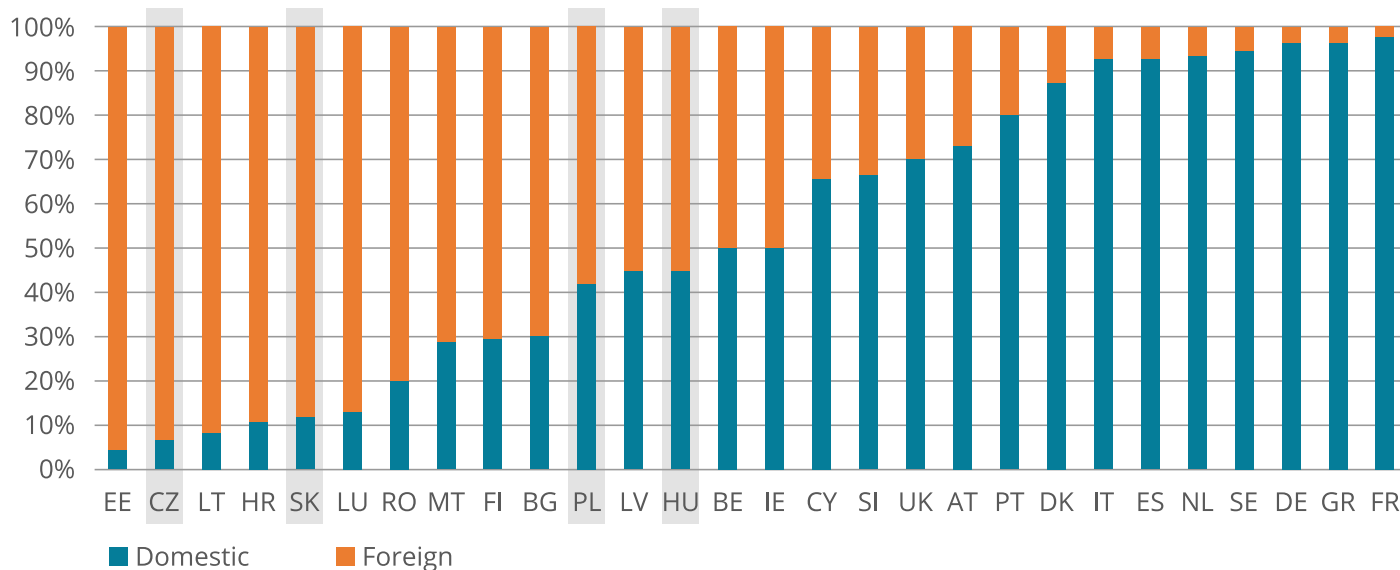
Due to length limitations on this report, some other findings in the literature cannot be tested here, although might serve as a basis for further research. These include (1) foreign banks are more profitable in less developed countries (Chen & Liao 2011); (2) foreign banks are less responsive to domestic monetary shocks, which undermines the effectiveness of the bank lending channel of the monetary policy (Wu et al. 2011); and (3) foreign banks played a significant role in spreading the contagion during 2007-09 financial crisis (Cetorelli & Goldberg 2010).

### 3.4.1 Optimal bank ownership structure

In Hungary, there has been a recent move towards creating a more domestically controlled banking sector. This example is announced to be followed by the Polish government, as well, meaning the economic policy in these countries believes a domestically controlled banking sector is "optimal."

Figure xx.xx shows the bank ownership structure divided between foreign and domestic owners for each EU member states by H1 2014. Out of the V4 countries, the Czech Republic has the smallest domestic ownership of about 7%, and Hungary has the highest, ranging up to 45% by then; moreover, due to recent government transactions, this ratio has reached 55%.<sup>99</sup>

Figure 5: Bank ownership structure in the EU member states, H1 2014, based on total bank assets.



Source: ECB <https://www.ecb.europa.eu/stats/money/consolidated/html/index.en.html> own visualization.

All Eastern-European countries displayed above are characterized by predominantly foreign-owned banking sectors - while for Western European countries with a longer history of capitalism, the structure can be described as antithetic, as foreign banks play a marginal role.

Although we do not like to prioritize any ownership structure model over another, there are clear advantages and disadvantages each form implies. The most important advantages of foreign owned banks for the host countries are: (1) in the upside part of the business cycle they lend more, having more funding granted by their parent institutions (Aydin 2008); (2) they increase competition (Jeon et al. 2011); and (3) transfer their risk management and contract execution expertise, which is important for countries with underdeveloped institutions. Disadvantages include: (1) in the upside part of the business cycle, it strengthens the competition based on excessive risk-taking; (2) in the downside part of the business cycle, they decrease lending by an extent larger than their domestic competitors (Aiyar 2011; Cetorelli & Goldberg 2010) and have a tendency toward 'cream-skimming' or 'cherry-picking', hence decreasing overall lending exposure (Bruno and Hauswald 2012).

99 [http://www.portfolio.hu/finanszirozas/bankok/bankok\\_magyar\\_kezben\\_ket\\_lepesben\\_teljesult\\_orban\\_alma.220294.html](http://www.portfolio.hu/finanszirozas/bankok/bankok_magyar_kezben_ket_lepesben_teljesult_orban_alma.220294.html)

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Figure xx.xx also indicates that the more developed EU members have a larger domestic ownership rate of banks. A few exceptions include Finland or Greece. Looking at only the V4 countries, it is to be noticed those with higher GDP/capita (Czech Republic, Slovakia) have lower domestic bank ownership ratios, while those with lower GDP/capita (Hungary, Poland) have higher domestic bank ownership ratios. We assume there is an inflexion point in development, until which a more dominant foreign bank ownership is desirable, but after which a dominant domestic bank ownership becomes inevitable for further growth.

As a result, eventually, all V4 countries should, somehow, orientate into the direction of a domestically controlled banking sector. However, following the “Hungarian model” introduced in the aftermath of the financial crisis, with the state buying banks from foreign owners, should be avoided, as the introduced policies were very costly and being not market friendly they created an uncertain business environment which in our opinion contributed to a lower growth as compared to the other V4 countries.

### The special role of state owned banks

Given the increasing penetration of state owned banks in the region (especially in Hungary), we believe in the importance of looking at what anomalies this might cause on the market, if any.

State owned banks lend less pro-cyclical, which is less effective in their risk assessment, on the one hand; on the other, it is a supportive factor during economic downturn (Claessens and van Horen, 2012). Dinç (2005) examined the influence of political decisions on state-owned banks in emerging markets. The dataset he used includes our countries classified as emerging markets, although it misses Slovakia. He shows that governmental control over banks causes an increase in lending in election years, later confirmed by (Micco et al. 2007). This anomaly is not visible in developed countries (Dinç 2005; Micco et al. 2007). State owned banks also charge lower interest rates (Sapienza 2004). This causes state owned banks in developing countries to be less profitable. (Micco et al. 2007)





Moreover, banks controlled by the government are less responsive to the monetary policy, since they can counteract and raise additional funding, even in a restrictive monetary environment. The greater state ownership in the banking sector causes the monetary tightening to have less impact on the level of loan supply (Andries & Billon 2010).

In our view therefore state ownership in the commercial banking sector is something to be avoided, unless the state banks perform in a dedicated niche market to support certain policies, like e.g. eco-friendly building.

### 3.4.2 Banking sector stability

The banking sectors in the Visegrad Group display not only a drastic difference to Western European mature markets in foreign ownership ratios, but also in other key indicators. Except for Hungary, in the years after the financial crisis, where the government introduced several policies threatening the banking sector’s profitability, like the extraordinary high bank tax or CHF- compensation programmes, Visegrad’s banking sectors are characterised by a high profitability. With return on equity ratios over 10-15%, many banks in the region usually outperform the profitability of Western banks, including their parent banks (Raiffeisen Research, 2015). It is also important to highlight that the high level of returns is not achieved on the expense of the liquidity of capitalisation of the sector of our region. Banks and local regulators emphasised the importance of a secure capitalisation of the banks, mirrored in the high capital adequacy ratio (CAR). The ratio describes the capability of banks to absorb reasonable amounts of loss with their capital and is being used by financial supervisory authorities to steer capital requirements of banks. A basic point of reference are the Basel III requirements, which require a minimum CAR of 10.5% (including a conservation buffer). As seen from the table below, the banking sectors of all four countries were sufficiently equipped with capital at any of the chosen points of reference, which is another good indicator for the financial stability of the sectors. Interestingly, Hungary also displays

high capital adequacy ratios, which are based recapitalisations of foreign subsidiaries through their parents, governmental acquisitions of less financially potent banks, and deleveraging trends of the last years.

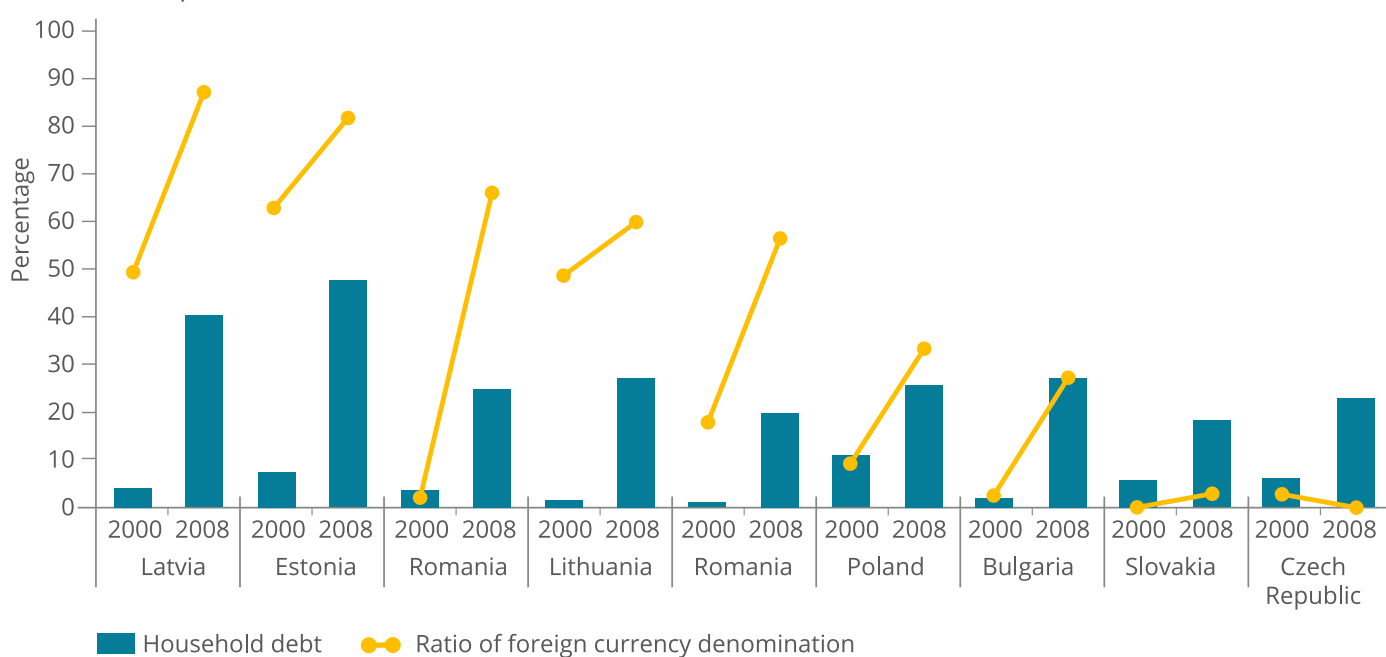
Country	Czech Republic			Slovakia			Poland			Hungary		
Indicator												
Year	2004	2010	2014	2004	2010	2014	2004	2010	2014	2004	2010	2014
Total assets, EUR mio	86,709.6	173,191	194,677	30,023.6	54,695	62,742	141,889.9	292,755.0	359,502	68,280	121,268	101,652
Total assets, in % of GDP	97.1	109.6	126.3	87.4	81.4	83.4	65.3	81.8	88.8	83	124	100.4
Total loans (% of total deposits)	167.3	78	77	188	84	91	126.4	<b>113</b>	105	96.1	140	107
Return on Assets (RoA)	1.3	1.3	1.2	1.2	0.9	0.9	1.4	0.9	1.1	2.2	0.2	-1.3
Return on Equity (RoE)	24	22.5	17	13.5	12.3	10.3	18	13.7	12	26.5	2.3	-13.2
Capital adequacy, in % of risk weighted assets	13	15.5	18	19	12.7	17.4	16	13.7	15	11.8	13.3	17
Classified loans, in % of total credits	11	6.5	6	4.6	6.1	5.4	16	7.8	8	1.9	7.8	13.3

Visegrad's banking sectors display healthy sources of funding of their loan exposure. With Hungary, Poland and Slovakia, having loan to deposit ratios of around 100%, and the Czech Republic even significantly below 100%, loans are congruently funded mostly by deposits. This means banks can count on a cheap and stable source of domestic funding, instead of riskier and volatile foreign funding.

### 3.4.3 Foreign currency debt issue in the V4 countries

In our region, foreign currency (mainly CHF and EUR) mortgages became more and more popular in the mid-2000s, especially in the Baltic countries and Hungary. As shown on Figure xx, of the V4, Poland was also affected, having a penetration of about 30%, while in Slovakia and the Czech Republic, foreign currency denominated debt stayed insignificant.

Figure 6: Household debt in the percentage of GDP plus the ratio of foreign currency debt to all household debt. Source:(Hudecz 2012, p.353), own translation



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In Hungary, the main reason for the significant spread of foreign currency denominated debt was the conditions of the state-funded home buying support program became tighter (Hudecz 2012; Balás & Nagy 2010; Bethlendi et al. 2005), so homebuyers had to turn somewhere else for funding. Not only mortgages, but car-loans and home-equity loans, were also sold in foreign currencies. The positive attitude towards foreign currency borrowing was fuelled by borrowers' conviction of Hungary's rapid Eurozone accession. In Poland, foreign-currency borrowers were urban middle-income families benefiting from lower interest rates, hence, higher borrowing capacities for mortgage loans. The problem, therefore, was less pronounced compared to Hungary.

Although foreign currency debt looked fairly favourably at first, Berlinger & Walter (2013) identified that net income, interest rate, and exchange rates can significantly change both the debt service burden and the loan/collateral ratio. They argue an increase of the first reduces the repayment capability, while the second reduces the willingness to repay. Due to the adverse changes in all three factors, both the willingness and the capability to repay of the borrowers decreased significantly. Both factors, combined with Hungary's economic slowdown, led to high risk for Hungary's overall stability, and the imposed solutions had a drastic influence on Hungary's banking sector.

### 3.4.4 Recommendations

#### Maintain stability of banking sectors

Concluding from the basic indicators of financial stability, Visegrad's banking sectors can be characterised as profitable, well-capitalised, and regulated banking sectors, which enhances, among others, their financial stability. Given the essential capital-extensive investments in infrastructure and innovations that still lay ahead of us, financial stability is key to the further advancement of our economies. Our governments should, therefore, consider a stable and supportive environment for the banking sectors as prerequisite of economic policies.

#### Increase share of domestic ownership

Poland's well-diversified banking sector finds appreciation from various sources, i.e., the IMF. However, looking at foreign and domestic ownership ratios across other EU-countries, the more developed EU members have domestically controlled banking markets. Our countries need foreign capital to grow, yet at some point, the independence in decision making might be worth more than the capital to enhance further economic development. We believe, with the advancing development of our economies, the structures of our banking sectors should increasingly resemble the structure of more mature markets.

Therefore, our main recommendation is, eventually, the V4 countries will enlarge the domestic control (ownership) over the banking sector. It has to be pointed out, this will not imply the step-in of the state as an owner, and due to many negative consequences it may cause the market. Possible owners should, therefore, be mutual funds, pension funds, other domestically controlled common investment vehicles, and retail investors.

## 3.5 Alternative sources of funding

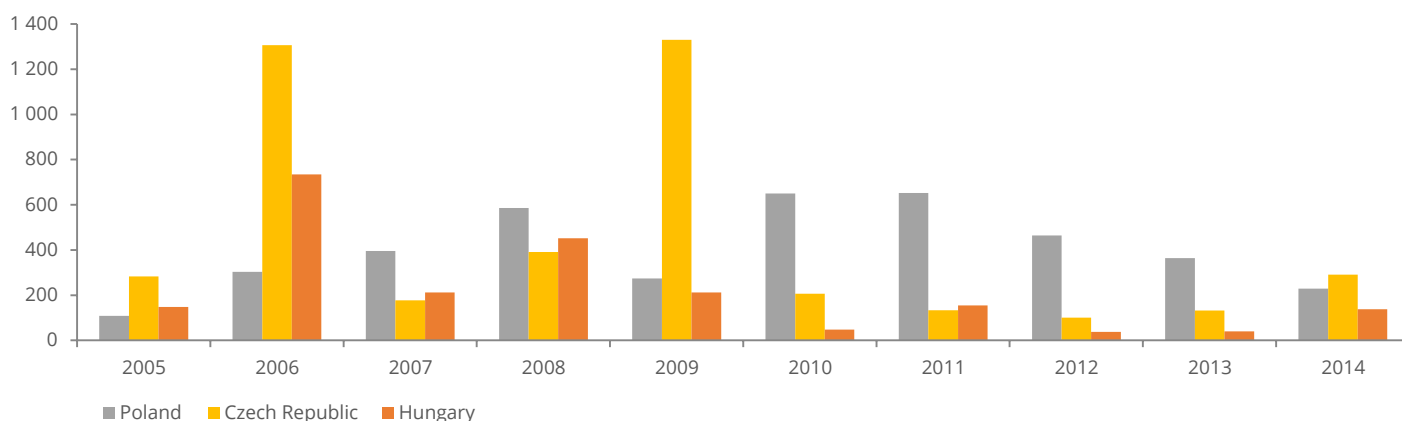
In modern economies, Private Equity is the third most important source of capital for enterprises, after the banking sector and public stock exchanges. In fact, Private Equity is a combination of features of both: it offers equity capital – just as public offers on the stock market, but the funds are provided for a limited period – comparable to bank credit and bond offerings. Private Equity provides a unique feature in the form of the know-how of their management, who often are experts in creating value in investee companies. This value creation is a win-win situation for the Private Equity fund with its investors and for the economic environment in which the business operates, leading to increased value for the economy.

Private Equity capital entered the Visegrad Group after the collapse of communism in 1989-1990. Due to the high risk perception of these markets among investors and the institutional uncertainty, the first investments were backed by institutions, such as U.S. Congress, EBRD, and IFC. In subsequent years, the first fully commercial funds appeared, lured with decent returns made by first entrants. It is worth stressing that, initially, the PE markets in all the V4 countries were driven by privatization of state-owned companies, which usually were sold at bargain price, yet comprehended significant growth potential. Due to low investments and respective low accessibility of reliable data for Slovakia, the below chapter will focus on the remaining V3.<sup>100</sup>

### 3.5.1 Recent development of the PE sectors

The accession of the V4 countries into the European Union in 2004 ignited a tremendous increase in the level of activity of Private Equity funds in the region. The surge in values of realized transactions was mainly affected by the entrance of global funds operating from outside the region, which often realized single transactions, but on an unprecedented scale. Global funds were joined by pan-regional players, who raised larger funds and took their stake in the most sizeable transactions.

Figure 7: Value of annual investments of Private Equity funds between 2005 and 2014 in EUR million

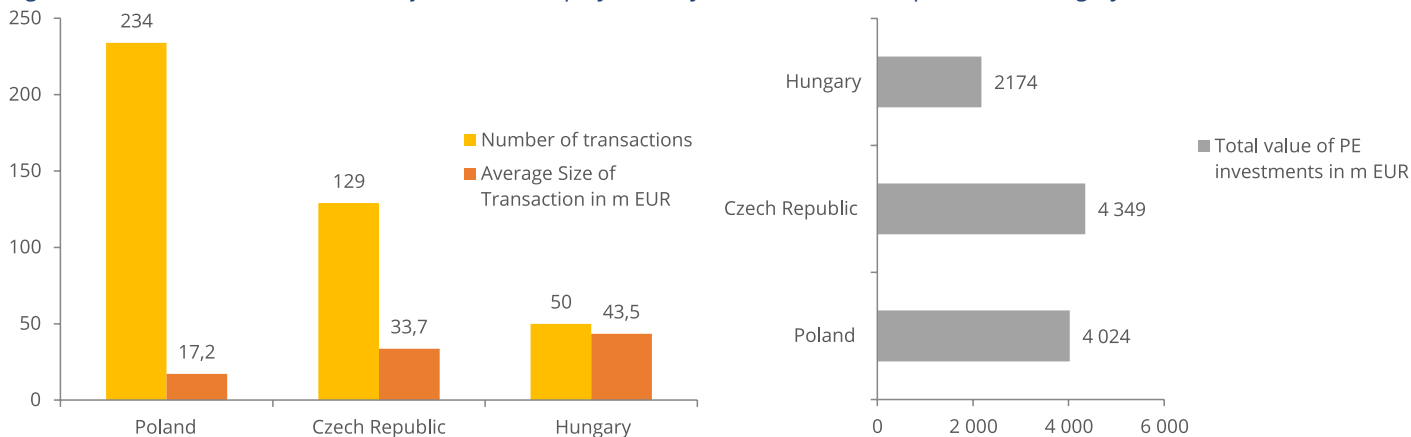


Source: Own calculations based on data provided by EVCA

From 2005 to 2014, Private Equity investments reached 4bn EUR in Poland, 4.3bn EUR in Czech Republic, and 2.2bn EUR in Hungary. Even though the Czech market is largest in terms of value, roughly half of this number was generated by the two most sizeable transactions, exceeding 1bn EUR each. It is easy to observe that the peak time for both, the Czech and Hungarian markets, was between 2006 and 2009, when large buy-out transactions took place. After that, the market shrank, hitting the bottom line in 2012. The investment cycle in the Polish market was delayed, where the peak was recorded between 2010 and 2011, and after that, the market dried out.

<sup>100</sup> Whole paragraph based on: Jez, V., 2010, 'Private Equity & Venture Capital in the Czech Republic', Czech Private Equity & Venture Capital Association, Prague; Judit, K., 2005, 'The Development of The Venture Capital and Private Equity Industry in Hungary 1989-2004', Hungarian Venture Capital Association, Budapest; Klonowski, D., 2011, 'Private Equity in Poland', Palgrave Macmillan, New York;

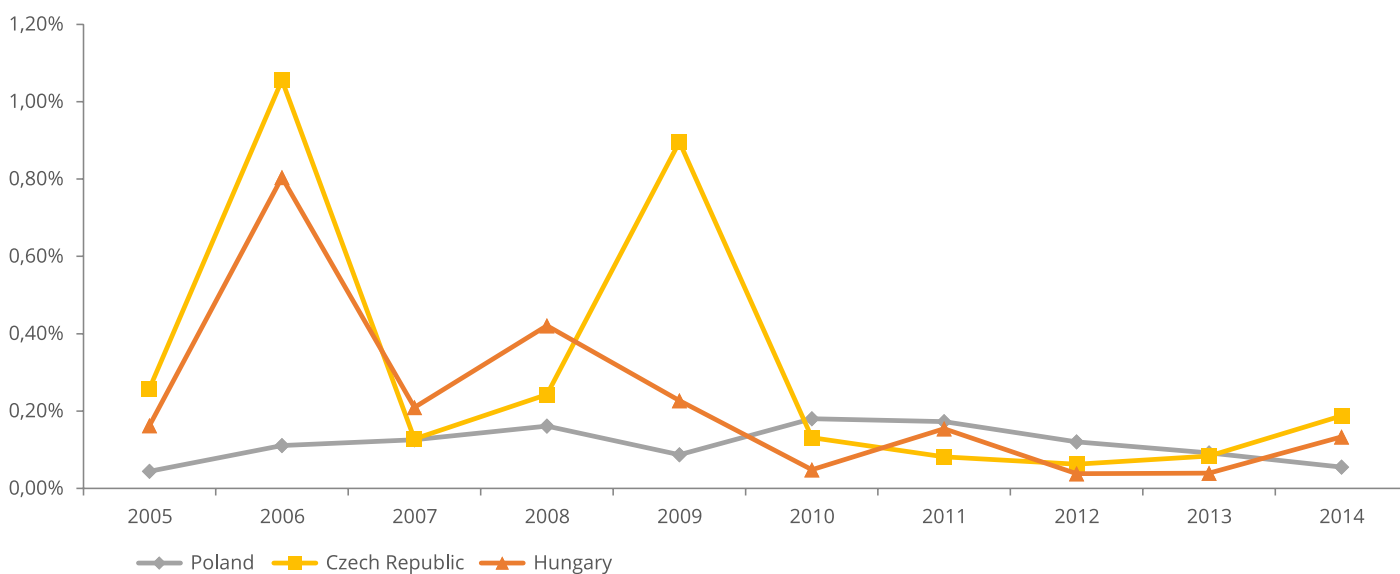
Figure 8: Cumulative characteristics of the Private Equity industry in Poland, Czech Republic and Hungary 2005-2014



Source: Own calculations based on data provided by EVCA

The structure of the Polish PE market differs substantially from its neighbours. The quantity of deals realized annually is higher, yet the average transaction is of lower value. To emphasise, in Poland, there has been no Private Equity investment exceeding value of EUR 500m, so far, while in Hungary and the Czech Republic, PE funds realized several transactions largely exceeding this size. The fragmentation of the Polish market, however, resulted in developing Poland-based Private Equity funds focused on mid-cap companies, which by transferring the know-how acquired on the domestic market, literally dominate this market segment in the region.

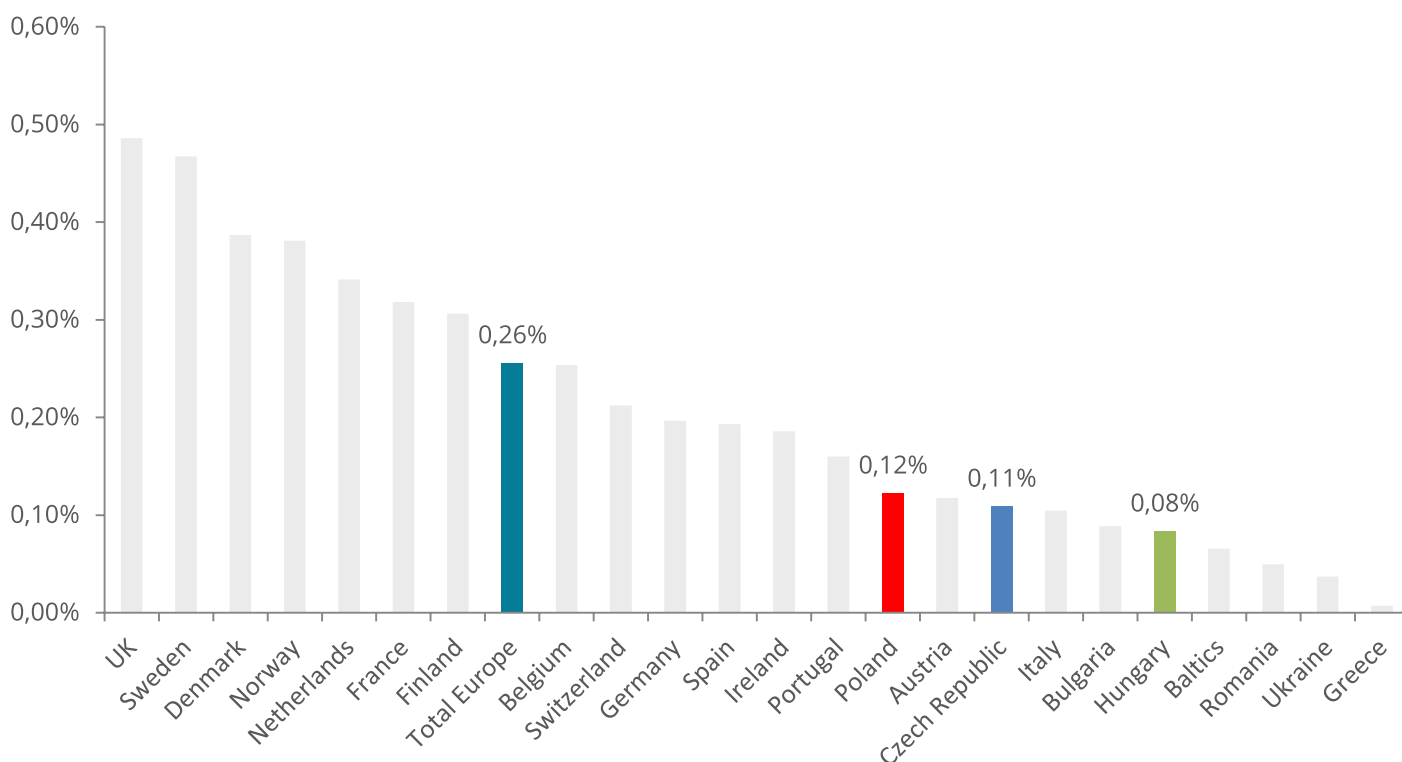
Figure 9: Relation of Private Equity Investments to GDP between 2005 and 2014



Source: Own calculations based on data provided by EVCA

Comparing the relation of Private Equity investments to national GDP, it is easy to observe that after the period of tremendous buy-outs that resulted in surge of this measure in Czech Republic and Hungary, the ratio is relatively consistent among the three analysed countries. As seen below, it is especially visible in the period from 2011 to 2014.

Figure 10: Average PE/GDP ratio among major European economies between 2010 and 2014



Source: Own calculations based on data provided by EVCA

Compared to all the major European economies, significance of Private Equity in Poland, Czech Republic, and Hungary is considerably lower than in almost all the 'old EU countries'. The average contribution of the Private Equity market in the European economy in 2010-2014 was equal to 0.26%, while in the most attractive countries for PE, funds reached 0.34%-0.49%. The Visegrad Group has significant potential to use PE financing better; however, it faces significant obstacles in its way.

### 3.5.2 Obstacles for the development of PE in the Visegrad Group

First is a problem in generation of relevant deals. Many Private Equity funds that entered the region found it difficult to build a pipeline of potential transactions. With the expiry of privatization programs and most private companies having not yet reached appropriate size, especially large PE funds with min. equity tickets of EUR 50m ended up with lack of potential targets to invest. Sizeable amounts of capital committed by investors during the peak time end as a never invested 'dry powder'. Even the most successful mid-cap and small-cap PE firms struggle to gather a pipeline that will be large enough to build a well-diversified portfolio of investee companies.

The main reason is a prevalent misunderstanding of the rationale behind PE activity among entrepreneurs and its impact on the growth of businesses in the expansion stage. Many businesses in the region are still characterized by relatively simple, low value-added, not sustainable business models (e.g., highly dependent on one customer), lack of long-term strategy, and low level of innovativeness. Their attractiveness for value seeking investors as PE funds is low. Such a limitation of attractive targets often leads to bidding wars between PE funds in the region when interesting targets arise. These wars result in overpaid transactions, which make it difficult for funds to generate required returns.

Another issue is the deeply rooted significance of personal connections and local entrenchment in the markets, which makes not only the origination process, but also the management of investee companies and exit from them very challenging for foreign based firms. The barrier was tried to overcome by establishing regional offices led by local professionals; nevertheless, it has not solved all the problems, as often, the entrenchment in the market is needed in the highest level of management. This is also one of the secrets behind the huge success of mid-cap firms led by local managing partners, who are sometimes even founders of these firms.



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Exiting the investee companies is often another source of problems for PE funds in V4. The predominant exit method is trade sale to a strategic buyer. Based on the limited liquidity of local capital markets, this form of divestment is especially important. As the number of local strategic players, which are sizeable enough to undertake larger M&A transactions, is limited, PE funds often rely on selling their portfolio companies to foreign investors, who are highly vulnerable to overall economic conditions of the region and overall global market sentiment. This often limits the ability of the funds to divest their assets at satisfying prices.

The prevalent problem of the region is also marginal contribution of local Limited Partners in funds raised by the local PE sector. While in Europe, domestic investors contribute ca. 28% of funds raised by PE, and in some countries, this ratio even exceeds 40% - in V4, only around 10% of capital is provided by local investors<sup>101</sup>. Those differences originate also from the reluctance of local players, including banks and insurance companies, to invest in this asset class, and regulations, which do not allow, e.g., pension funds, to contribute in PE investments. Such low levels of contribution of local capital in PE funds not only directly diminishes the capital base, but also discourages foreign investors from participation in ventures.

Finally, there are also issues that affect the Private Equity industry in an indirect way; however, it is necessary to stress their unquestionable importance for the underdevelopment of the markets in Visegrad Group. Those are connected to a generally negative environment for investment, incl. lacking professional standards and negative attitude towards financial investors and capital markets.

All of the above mentioned problems resulted in decreased attractiveness of the region for Private Equity investors. The recent fundraising efforts of local funds were significantly below expectations.

### 3.5.3 Growth prospects

Despite the gloomy picture of the PE market in V4 countries in the last paragraphs, there is also a silver lining. First, the region is still much more attractive in terms of growth opportunities than almost all of the 'old EU countries'. This growth factor has been a main motive for foreign investors to enter our markets in the last two decades, and we believe that in the medium- to long-term, the trend will continue. Therefore, PE funds will have the potential to continue consolidating fragmented industry sectors in the Visegrad Group, such as consumer goods and services, healthcare, pharmaceuticals, and particular segments of telecommunications industry. There will still be potentials arising for sizeable transactions from spin-offs from restructured state-owned companies and renationalisation endeavours, especially from the Polish and Hungarian governments in the long-term.

Given the perennial budget deficits in most local authorities in the region, which stand in contrast to significant infrastructural needs, partnerships of PE funds with local authorities and municipalities are an attractive source of potential investments for PE funds in the future. A blueprint for this type of transaction has been set in 2014, by acquiring the largest operator of cable cars and ski lifts in Poland by a PE fund.

The PE markets in more advanced economies in Europe are turning to more sophisticated transactions than pure consolidation driven growth deals. These transactions include, e.g., acquisitions of platform companies to integrate the entire supply chain around them, or deals with advanced financial engineering structures. Such complex transactions will require much more effort and skills of PE funds; hence, the value added from activities of PE funds for the economy is likely to increase considerably. This trend will also expand onto the Visegrad Group, leading to a higher professionalization among PE funds, crowding funds out of the markets, which will not be able to perform those types of sophisticated transactions. However, we see prospects of improvement of the pipeline in the coming years.

The fact that many small, private businesses, established early after the economic transformation, have grown large enough to become possible targets for PE funds is one of the most positive signs for the PE industry in the region, especially for mid-cap focused funds. These companies have often been developed solely by their founders and become family businesses, without clear succession strategies. With

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<sup>101</sup> EVCA, 2015, 'Central and Eastern Europe Statistics 2014', European Private Equity & Venture Capital Association, Brussels

founders approaching the retirement age, these businesses will strive for new owners or experienced partners supporting the next generation in further development, hence giving PE funds attractive investment prospects.

**Weighting the obstacles and growth potentials for the PE sector in V4, we come to a positive conclusion. We believe that Private Equity as mean of finance has got high upward potential and could be a crucial partner for the increase of value-added activities of companies from our region.**

Clearly, there is a substantial upward potential for the PE market in V4 countries; however, to ensure exploitation of this potential, some crucial measures must be implemented (some key areas must be revised).

### 3.5.4 Recommendations

Several countries in Europe, namely the United Kingdom, Sweden, Denmark, Norway, and the Netherlands, are outstandingly attractive for Private Equity funds. Those countries share characteristics we would like the Visegrad Group to use as role model to develop our local PE markets and catch up with European average.

#### Increase financial stability and economic friendly environment

Financial stability of an economy can be reflected by credit ratings assigned by international rating agencies, such as Standard & Poors. As shown in the following table, all 'role model' countries ensure the highest possible AAA rating, translating into almost zero risk of credit default of their sovereign debts, also indicating a low risk of investment into the country. This is achieved through sound economies, stable financial systems, and safe political climate. Although this factor is important to investors in capital markets and the economy, it is especially vital to investors providing capital for PE funds, which are perceived as an asset class with one of the highest exposures to risk. The overall business environment plays a crucial role, and it is not a coincidence that the 'role model' countries are ranked top positions of the World Justice Ranking<sup>102</sup>, World Bank's Ease of Doing Business Ranking<sup>103</sup>, and others. The improvement of law system and protection of foreign investors is in line with the earlier mentioned financial stability, an absolute sine qua non for developing PE sector in the Visegrad Group. To increase and maintain their higher credit rankings, the Visegrad Group countries should treat a predictable and safe political climate, sound economic growth, and stable financial sectors as an absolute priority of their policies. The Group could collaborate on these fundamental issues and benefit from intra-Group spill-over effects.

Country	S&P Rating as at 26.02.16	Stock Market Cap/GDP ratio in 2014	World Justice Ranking	Ease of Doing Business Ranking	Global Innovation Ranking
United Kingdom	AAA	129%	12	8	2
Sweden	AAA	131%	3	11	3
Denmark	AAA	101%	1	4	10
Norway	AAA	57%	2	6	20
The Netherlands	AAA	100%	5	27	4
Poland	BBB+	71%	21	32	46
Czech Republic	AA-	24%	20	44	24
Hungary	BB+	15%	37	54	35

Sources: *gpw.pl, oslobors.no, sdw.ecb.europa.eu, nasdaqomx.com, londonstockexchange.com, ftp.pse.cz, bse.hu, tradingeconomics.com*

102 [http://worldjusticeproject.org/sites/default/files/roli\\_2015\\_0.pdf](http://worldjusticeproject.org/sites/default/files/roli_2015_0.pdf)

103 World Bank Group, 2014, 'Doing Business 2015', <http://www.doingbusiness.org/-/media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB15-Full-Report.pdf>

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## Increase innovativeness of our economies

The economic change is increasingly based on enterprises connected to new technologies. Some are disruptive businesses, which by changing established industries, are also becoming increasingly attractive to PE capital. However, in terms of innovativeness, our region also lags behind such countries as the U.K, Sweden, Netherlands, or Denmark, which are ranked in the top 10 of Global Innovation Ranking<sup>104</sup>. Our recommendations towards creating the new Silicon Valley in our region aims at closing this gap, which will lead towards an entrepreneurial eco-system, promoting innovativeness and, eventually, attract PE capital.

## Increase significance of capital markets

All but one of the analysed 'role model' countries possess stock exchanges with the capitalization exceeding their annual GDPs. Such sizeable platforms allow Private Equity funds invested in the country to exit their portfolio companies by IPO in the local market, which sometimes is an appealing alternative to sales of the company to a strategic buyer. The trend towards a higher sophistication of transactions will also increase the demand for more sophisticated financing structures and financial products. The development of our capital markets are significantly important to the economies of the Visegrad Group, hence will be elaborated on in the next chapter.

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<sup>104</sup> Dutta, S., Lanvin, B., Wunsch-Vincent, S., 2015, 'The Global Innovation Index 2015', Geneve

## 3.6 Capital Market and Stock Exchanges

### COMMENT

*The development of a vibrant capital market in V4 countries is crucial to long-term financial stability. It allows for raising capital and providing liquidity in a safe manner, in local currency and without reliance on a frequently constrained financial sector. Such development is not happening in isolation from the changes taking place in the rest of the world. But developing financial sector and capital markets is not a new topic for V4, it all started 25 years ago with first privatisations, IPOs, establishment of stock exchanges, privately owned banks, brokerage houses. V4 did catch up quickly in the past 25 years but what does the future hold? Will V4 capital market resemble a perfectly organised French garden or rather more a wild English one? How will innovations, like crowdfunding, and globalisation shape the V4 market in the next 25 years?*

**Jacek Kubas**, Principal, Local Currency and Local Capital Market Development, European Bank for Reconstruction and Development

### 3.6.1 Significance of Capital Markets

The level of maturity of the domestic capital market is usually associated with the level of development of an economy. Various research studies indicate that an efficient capital market is beneficiary to economic growth, macroeconomic performance, job creation and hence growth in living standards.

Modern capital markets have got two basic, interrelated functions: they help to allocate capital within an economy and help to manage risks. In the former it channels through debt and equity markets capital towards companies, which use the capital for further investments and developing their activities, further fuelling their growth. In the latter investors and companies can use the derivatives market to overcome risks they have in their portfolios and asset/liability exposures<sup>105</sup>. Prices on capital markets adjust constantly – giving evidence of changes in the outlook of investors' investment decisions to buy or sell assets. Thus the allocation of capital is based on market principles, ensuring an efficient allocation of capital. This enforces discipline on policymakers and listed companies, which must constantly work on their product and service range, business model, etc. to attract capital inflow. Companies therefore have to put continuous effort into communication with current and potential investors, which also enhances the professionalism and transparency of companies. The constant market verification, in theory, also simplifies the work of state authorities, as they (and eventually the tax payer) benefit from a higher visibility and shared burden in controlling listed companies<sup>106</sup>. The increased professionalization and transparency has played and still could play a vital role in further advancing the transformation of 'state-molochs', which are still present in the Visegrad Group. State-molochs are former state-owned companies that have not or have been partially privatised; consequently, their decisions regarding management position allocation and business activities are still largely influenced by governments and individual politicians. This influences negatively the companies' perception on capital markets, hence hampers market valuations and value creation, even if they have professional managers.

Capital markets offer opportunities for a broad scope of entities, starting from small to medium-sized enterprises, over international conglomerates to municipalities. With the background of tight communal budgets and utilisation of EU-funds in V4, capital market financing becomes increasingly important for the latter. More importantly, capital markets enable the provision of capital to companies which are less likely to obtain financing from banks: SME's and start-ups. Both need capital to accelerate their growth, with start-ups typically seeking equity capital. A dynamic capital market facilitates private equity investments of venture capital and other investors, enabling young companies to prosper and eventually build up a successful track record, which could lead to an initial public offering (IPO) at the stock

<sup>105</sup> Dudley, William C. and Hubbard, R. Glenn (2004); How Capital Mark Enhance Economic Performance and Facilitate Job Creation; Global Markets Institute Goldman Sachs; New York

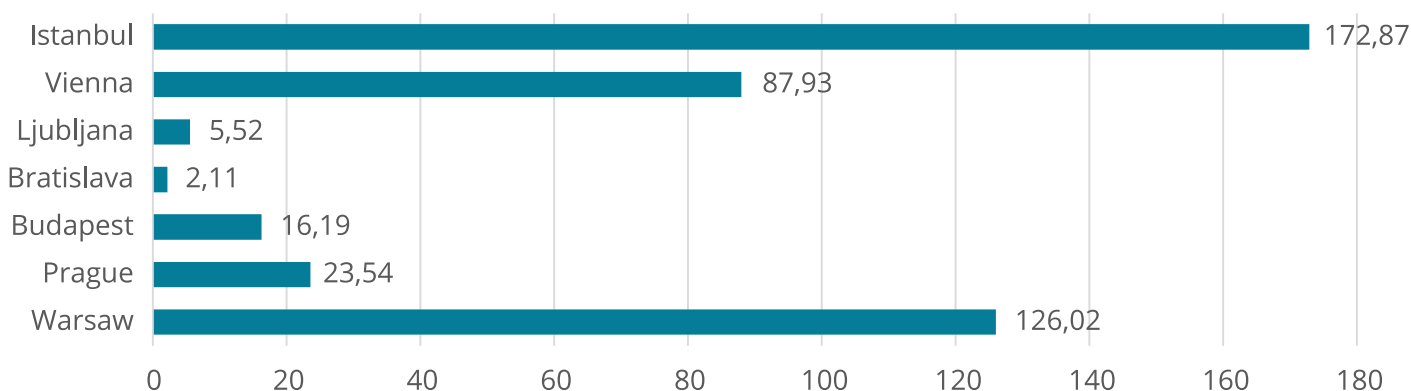
<sup>106</sup> Warsaw Stock Exchange (2015), investor

exchange. As described in earlier parts of the report, these financing possibilities are interrelated and self-reinforcing. Start-ups gain much needed capital for rapid growth, investors gain an exit option, attracting more investors.

More established companies using capital market financing can attract finance for projects with higher risk profiles, which possibly would not receive funding from banks. This helps to foster innovation and competitiveness, benefiting the economy overall. Therefore, the capital market offers a real alternative to bank lending, leading to a more diversified, hence sustainable financing structure, as well as decreasing costs of funding for the economy.

### 3.6.2 Capital markets in the Visegrad Group

Figure 11: Market capitalisation of main stock exchanges in CEE (Value at December 2015 in bn. EUR)



Source: Warsaw Stock Exchange, Federation of European Stock Exchanges (2016)

The capital markets of the Visegrad Group are classified as emerging markets. This is being expressed by the sophistication of the markets, the availability of financial products, and the capitalisation and liquidity of the respective markets. The total capitalisation of the stock exchanges in V4 equals to EUR 165bn., with Warsaw Stock Exchange (WSE) being three times larger than the remaining bourses of the Visegrad Group aggregated (per January 2015). Established in 1991, WSE could grow in size, thanks to its role as facilitator of privatisations of state-owned corporations. The capital market, therefore, had a crucial role in the transformation of Poland's economy. The Polish capital market was largely benefitting from investment activities of private pension funds (OFE), which constituted the third, private pillar of the pension system. The funds were key players in the region's capital markets by largely investing in local equity and debt. In 2014, however, the Polish government introduced Hungary-inspired reforms to nationalise significant parts of the funds' assets, initiating transfers of PLN 153bn. into the state's social insurance system. Additionally, the government largely restricted investment activities of the funds, which in combination with transferring assets, became a nail in the coffin of the funds' capability of continuing to be a significant market player on the region's capital markets. Pension funds traditionally constitute an important growth factor for emerging markets capital markets. Based on their strong regulations and long-term investor profile, which often included a buy and hold strategy for their investment (until the maturity of the security), they have also hampered a secondary market to develop necessary liquidity.

With a capitalization of nearly EUR 25bn., Prague Stock Exchange is the second largest stock exchange in V4. It is part of the Central and Eastern European Stock Exchange Group (CEESEG), which until recently, consolidated the stock exchanges of Vienna, Prague, Bratislava, and Budapest. By 2015, CEESEG sold the latter two bourses, with Budapest being acquired by the Hungarian Central Bank. The main growth driver for Poland's capital market were voluminous privatisations of state-owned companies – a strategy the Hungarian government intends to imitate for the privatisations of its shares in companies, including recently acquired banks and energy utilisation companies (Zoltan, Lovasz, & Balazs, 2015). Hungary's capital market is, by a small margin, smaller than the Czech Republic's (see chart number ...). In 2010, Hungary's government has nationalised FT 3,000bn. (USD 14 bn) worth of assets during the private

pension reform in 2010. Comparable to Poland, it has led to a significant deterioration of domestic investors from an already small investor pool. In line with the size of its economy, Slovakia has the smallest capital market of V4. With a capitalization of EUR 2bn., it is of no significance for the domestic economy.

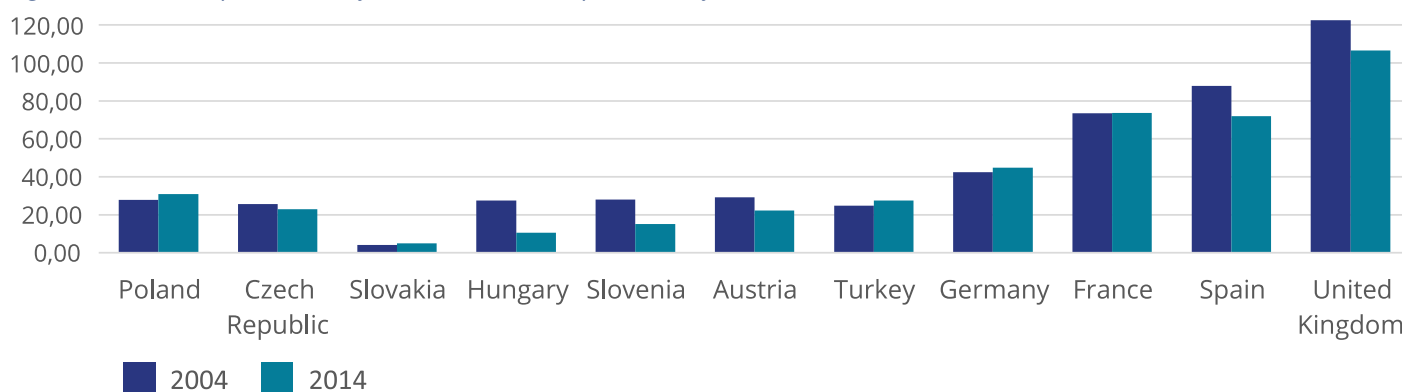
Comparing our stock exchanges to counterparts in the region, especially the region's main competitor Borsa Istanbul (Turkey), it becomes evident that our considerably underdeveloped and fragmented markets are increasingly losing competitiveness, which hinders growth of our companies<sup>107</sup>. Turning the look westwards, the mature capital markets of our European neighbours offer much higher access to investors and deeper liquidity on primary and secondary markets. This poses a huge risk of losing local companies as customers of our stock exchanges, hence, furthermore lowering the potential and significance of region's markets. In 2015, Hungarian low-cost airline, Wizzair, offered evidence for our region's low competitiveness, by choosing London over Budapest and Warsaw for its IPO<sup>108</sup>. Eventually, the capital market of the Visegrad Group is characterised by rather low turnovers, low liquidity and access to investors, and lack of a coherent long-term strategy for the development of the region's capital market – both, as individual markets, and Visegrad as a whole.

Additionally, there is a lingering underdevelopment of accounting standards, especially among private companies, which are not required to and rarely adhere to IFRS standards and, therefore, lose the potential interest of many foreign investors. Market participants try to overcome this hurdle with the support of professional advisors; however, sometimes it does not work as a total remedy.

### 3.6.3 Creation of a single capital market in CEE?

The CEESEG was founded in January 2010 to create an integrated Central European capital market under Vienna's leadership and to become a core competitor to WSE's rising position. Initially, both competitors were of comparable sizes: Warsaw was home to 800 companies with a total capitalisation of EUR 125.8bn, compared to CEESEG's EUR 128.5bn, yet composed by 248 listed companies (Carré, 2012). The market environment for the newly created group has proven to be unfavourable, as foreign investors rather consolidated their emerging markets positions because of the financial crisis. Also the expansion of the crisis into the underlying real economies of the respective members of CEESEG was not supportive for the development of the merged capital market. On the contrary, Poland experienced in that period the highest aggregated growth among the respective countries, which had somewhat of an assuasive effect on WSE. Vienna Stock Exchange, in connection with CEESEG, was also engaged in partnerships with stock exchanges from Southeast Europe. The vision of creating a single capital market for CEE advanced further with talks between WSE and CEESEG on a potential merger. The cessation of negotiations in 2014 confirmed that the combination of five stock exchanges with five financial supervision authorities, five boards, four currencies, and two divergent trading systems into one capital group is too sophisticated to create real added value. The failure of the merger raises the general question, whether it is possible to create a single capital market in CEE.

Figure 12: Market capitalization of listed domestic companies (% of GDP)



Source: World Bank, 2015

<sup>107</sup> Nič, M., & Świeboda, P. (2014). Central Europe fit for the future: 10 years after EU accession. Retrieved January 20, 2015, from <http://www.cepolicy.org/publications/central-europe-fit-future-10-years-after-eu-accession>

<sup>108</sup> Zoltan, S., Lovasz, A., & Balazs, E. (2015). Hungary's Orban Vows to Ease Bank Burden After 5-Year Battle. Retrieved December 23, 2015, from <http://www.bloomberg.com/news/articles/2015-02-09/hungary-s-orban-vows-to-ease-burden-on-banks-after-5-year-battle>



## Case studies: MILA and Nasdaq Nordics

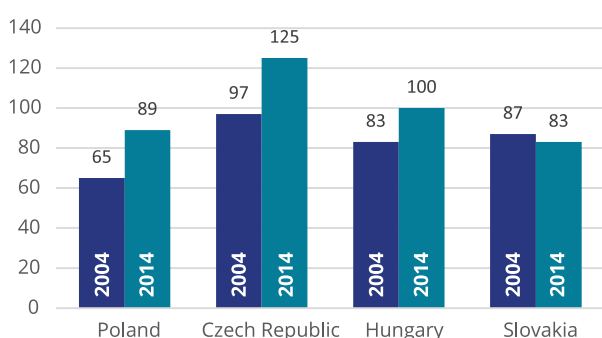
Alliances between cross-border stock exchanges are debateable, and recent failures of high-profile bourse mergers seem to justify question marks behind those. Chile, Peru, and Colombia launched, in 2011, the Latin America Integrated Market (MILA), which nearly doubled its market capitalisation to nearly USD 1tn. through incorporating Mexico Stock Exchange in 2014. In theory, the bourses were hoping to accomplish greater liquidity, larger economies of scale, and increase diversity of listed entities and financial products. MILA, offering one access point to four distinct markets, was expected to increase international visibility, eventually, leading to a higher investor base. However, although the stock exchanges advanced in the integration, relevant governments, public institutions, and regulators, so far, failed to advance the synchronisation, which prevails an integrated market to get its feet off the ground<sup>109</sup>.

Perhaps, long before their acquisition by Nasdaq in 2008, the Nordic stock exchanges of Finland, Sweden, Iceland, and Denmark depict a much better example of successful pan-regional collaboration. From the merger of Sweden's OM and Finish HEX (then forming OMX) in 2003 and incremental integration with other bourses, the countries managed not only to collaborate on the operational side, but also synchronised activities and policies of the above mentioned stakeholders, with significant influence on the development of cross-border capital markets. Admittedly the scale of the described capital markets exceeds V4's significantly (capitalisation of Nasdaq OMX Nordics & Baltics EUR 1.1tn. per 12.2015) and the Nordic/ Scandinavian states look back at a longer history of collaboration on various fields; however, they might display a counter-argument in favour of pan-regional alliances of bourses.

The case of Nasdaq OMX Nordics signifies that a mutual effort across borders raises opportunities for developing a functioning capital market of scale. As discussed above a stable financial sector is fundamental for a long-term sustainable development of economies.

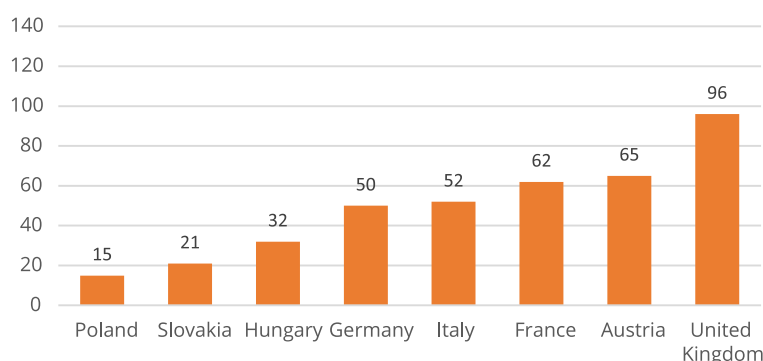
The Visegrad Group's financial sectors are very bank-centric, with total banking assets exceeding significantly the corporate debt instruments as percent of GDP (see graphs below). The total banking assets are below, or at par with GDP (except the Czech Republic), which is an indicator for a balanced funding of the economy. However, the low share of corporate debt instruments on the stock exchanges is an indicator of under-utilised potential of the capital markets. Although Poland leads V4 in the development of the capital market, with 15%, it has the lowest share of issued debt. This signifies that the whole of the Visegrad Group should put more emphasis on developing their capital markets, including corporate debt markets. Moreover, it is not to be forgotten that significant capital market financing occurs independently from stock exchanges. Single efforts will be far less effective than joint initiatives.

Figure 13: Total banking assets in mio. EUR (% of GDP)



Source: Raiffeisen Research 2015

Figure 14: Corporate debt instruments as % of GDP



Source: PwC, 2015

The development of local capital markets is increasingly linked to EU markets and legislation, especially given to prospect of an EU Capital Market Union. The opportunities and threats for our regional could be described at length, yet the EU membership facilitates convergence in regulations, infrastructure and instruments, hence capital market integration already. This raises the question about the long-term sustainability and feasibility of local or regional exchanges and capital markets. We believe that that with the ambition of developing our entrepreneurial eco-system, fostering the innovativeness of our start-ups, small- and medium-sized enterprises, and the overall economy a dynamic and vivid capital market in Visegrad is to be considered an important factor. Also smaller companies are less likely

109 Gallagher, J. J. (2015). MILA: Latin America's integrated market. Retrieved February 1, 2016, from <http://www.theworldfolio.com/news/mila-latin-americas-integrated-market/3586/>

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to be able to list on major exchanges. As even without in an EU Capital Market Union our fragmented capital markets run the risk of marginalisation, our countries should engage in strategic partnerships and collaborate to increase of the overall pie in the region.

Effective capital markets necessitate a firm foundation and long-term, ongoing nurture of its components. They consist of a stable political and macroeconomic development, which lead to predictability, enforcement of laws and property rights, transparency and accuracy in accounting and financial reporting, and regulations incentivising good corporate governance. These are ingredients, which lay the foundation for a long-term development and our recommendations.

### 3.6.4 Recommendations

#### Create long-term V4+ capital market development plan

To create a stable and stimulating environment for developing the capital market it is not sufficient to introduce individual improvements or initiatives. As indicated by the example of MILA, even if individual bourses collaborate effectively, without the support of regulators, supervisors, and governments, the market still will be hampered. Borsa Istanbul, the main competitor of WSE and the CM in CEE, has been created as a result of a strategic plan in 2013. Ever since, it has been developing strategic partnerships with bourses in the Middle East, Nasdaq, EBRD, universities, and others, thus advancing in significance on CM league tables. If our countries want to develop their capital markets, they have to prove clear commitment, based on trust and respect for market principles. We consider the development and execution of a coherent long-term strategy by governments, stock exchanges, and other crucial stakeholders as unconditional. We believe that by developing a strategic plan nationally and synchronizing it within V4+, our countries would (1) create a clear path for all participating countries, (2) combine efforts in developing a capital market in V4+, and (3) enhance financial stability of the whole region.

#### Put capital markets in a central role of sources of financing

The financial sector in Europe is bank centric. Even more so in V4. SMEs attract five times less funds from capital markets than in the US (WSE, 2015). Financing through capital markets enhances transparency, professionalism of companies, and helps to finance riskier projects. Given the background of inefficient state administration and bureaucratic state-owned 'molochs' in V4, CM financing should help to transform the economy. To diversify the sources of funding of the economy and increase competition within the financial sector, we recommend to incentivise companies for capital markets financing.

#### Creation of positive sentiment

Capital markets in our region suffer from negative market sentiment from entrepreneurs, potential retail investors, and politicians, who often perceive the CM as a 'casino'<sup>110</sup>. This understanding is based on insufficient financial education and has been fuelled by the financial crisis and the reforms of pension funds in Hungary (2011 and 2013) and Poland (2014). The reforms have decreased the prospects and funds available for investment on our capital markets, weakening their capability to support the economy and international competitiveness. The overall negative climate also influences the climate towards investing in the region, which is negatively affected by cases of unfavourable perception of foreign capital in the region and regulatory constraints for private and foreign capital in some sectors. The negative sentiment towards CM keeps retail customers away from investing on our CM. This is to be seen as considerable constriction to growth of the markets, as the total household deposits in V4 of EUR 256bn. exceed the total V4 market capitalisation of EUR 167bn. significantly<sup>111</sup>. We recommend creating a more welcoming political climate around stock exchanges, which would attract institutional and private investors.

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110 Kowalczyk, K. A. (2015). Politycy robią z giełdy kasyno. Retrieved February 02, 2016, from <http://www.rp.pl/Wywiady-i-opinie/308189819-Politycy-robia-z-gieldy-kasyno.html>

111 Federation of European Securities Exchanges (2016) Database

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## Introduction of new financial products

Next to low liquidity and low turnovers, our markets offer a much lower product diversity than our regional competitors. There are four Exchange-Traded Funds (ETFs) available on V4 Capital Markets (three Warsaw, one Budapest). Vienna Stock Exchange, although being half as large as ours (market capitalisation EUR 88bn.), offers nine products in this category. The same applies to the bond market, where Vienna listing 3,304 bonds offers around four times more debt instruments. We believe that to develop our capital markets, it is important to keep up with regulatory standards of mature European markets, which would enable us to introduce according asset classes. Prime examples for deficits in this respect are Real Estate Investment Trusts (REITs), which are not yet available in Poland, securitization. Also, we recommend expanding towards less orthodox asset classes. The Czech Republic, in 2014, has laid the basis for Islamic finance investments. Sharia compliant investment vehicles could be expanded, giving V4 access to further highly sought sources of capital. New asset classes could have the potential to attract higher amounts of diversified investors, enabling us to develop our capital market, whilst simultaneously tapping into new sources of finance to support the realisation of crucial investments for our economies.

## 4. CASE DISCUSSION

### A SINGLE CURRENCY WITHIN V4? SHALL THE VISEGRAD GROUP FOLLOW THE EXAMPLE SET BY SLOVAKIA?

Petra Kaciakova, Sebastian Wieczorek

#### 4.1 An economic snapshot for the Eurozone: a future full of challenges

Seven years after the beginning of the global financial crisis, the Eurozone still faces high risks of deflation and stagnation, a scenario similar to the decades-long situation in Japan. The financial crisis highlighted the inequalities between the Eurozone countries, largely ignored in the times of prosperity. As research has shown, the single currency had contributed to an increase in those inequalities<sup>112</sup>. To avoid deeper recession in the Eurozone, Mario Draghi, the President of the ECB, emphasized the “ECB is ready to do whatever it takes to preserve the euro”<sup>113</sup>. In September 2014, the ECB’s main refinancing rate reached 0.05%, and a few months later, the so-called quantitative easing “QE” was launched. The QE program provides the buying of bonds worth 60 bn euro monthly (ca. 2.4% GDP of the Eurozone) by the end of September 2016, with the possibility of further extension<sup>114</sup>.

Throughout the year 2015, we have observed either deflation or inflation slightly above zero. However, several important factors affected prices negatively, such as fragile internal demand, systematically decreasing oil prices, moderate food prices, instability of the Chinese and other emerging markets - a factor, which indirectly influences the perception of our region. The latest European Commission forecast (autumn 2015) estimated real GDP growth for the Euro area at 1.6%. The forecasts for 2016 and 2017 are 1.8% and 1.9%, respectively. The table below shows real GDP growth across selected EU countries, including a V4 average (without weights). It is clear that some V4 countries, especially Poland and Slovakia, better coped with the crisis; however, all members of the Group reached decent GDP growth in 2014.

Table 1: Real GDP growth rate in selected countries, percentage change on previous year (%), 2005-2014.

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Cumulative 2005-14	Cumulative 2009-14
Czech Republic	6.4	6.9	5.5	2.7	-4.8	2.3	2.0	-0.9	-0.5	2.0	21.6	0.1
Poland	3.5	6.2	7.2	3.9	2.6	3.7	5.0	1.6	1.3	3.3	38.3	17.5
Hungary	4.4	3.8	0.4	0.8	-6.6	0.7	1.8	-1.7	1.9	3.7	9.2	-0.2
Slovakia	6.4	8.5	10.8	5.7	-5.5	5.1	2.8	1.5	1.4	2.5	39.2	7.8
V4 average	5.2	6.4	6.0	3.3	-3.6	3.0	2.9	0.1	1.0	2.9	27.1	6.3
Euro area (19)	1.7	3.2	3.1	0.5	-4.5	2.1	1.6	-0.9	-0.3	0.9	7.4	-1.1
Germany	0.7	3.7	3.3	1.1	-5.6	4.1	3.7	0.4	0.3	1.6	13.3	4.5
France	1.6	2.4	2.4	0.2	-2.9	2.0	2.1	0.2	0.7	0.2	8.9	2.3
Spain	3.7	4.2	3.8	1.1	-3.6	0.0	-1.0	-2.6	-1.7	1.4	5.3	-7.5
United Kingdom	3.0	2.7	2.6	-0.5	-4.2	1.5	2.0	1.2	2.2	2.9	13.4	5.6

Source: Eurostat

112 N. Holinski, C. Kool, J. Muysken, Persistent Macroeconomic Imbalances in the Euro Area: Causes and Consequences, Federal Reserve Bank of St. Louis Review, 2012

113 Speech by Mario Draghi at the Global Investment Conference in London 26 July 2012, <https://www.ecb.europa.eu/press/key/date/2012/html/sp120726.en.html>

114 ECB conference press note, 22 January 2015, <https://www.ecb.europa.eu/press/pressconf/2015/html/is150122.en.html>

The next few years will be full of challenges for the Eurozone leaders and the whole economy; solutions to these challenges will be crucial also in the long-term. The US and the UK recoveries are faster than the Eurozone's, and hiking FED rates could additionally increase global inequalities. Europe must deal with a conflict in the Middle East, an ongoing refugee crisis, and disturbances in the foundations of the Schengen Area. Another key factor shaping Europe's future in the short-term is the UK referendum on the membership in the EU in mid-2016. In our view the British exit from the EU could affect isolationism and decrease the City's position. Europe still faces the unsolved Greece crisis with no solution on the table. An additional important issue is weak growth in the next years and financial markets turmoil. Declining growth in China, with huge price declines on the stock market, are creating additional uncertainty for the global economy. One more serious issue would be China's reforms towards a more open economy and more balanced GDP components (from investments to consumption). In conclusion, the Eurozone will face several serious issues in the next years. In our view the fate of the common currency and the openness towards accepting new members will depend on whether and how the Euro area will solve their issues.

## 4.2 Are we ready to join the Eurozone?

The Euro and its adoption is a highly debated topic among the Visegrad countries outside the Eurozone (referred as V3 below), and its outcome is still uncertain. The first step towards the common European currency is meeting the Maastricht convergence criteria. In the EU jargon, these criteria are simply rules for price and fiscal stability, rather than being part of a "process which unifies technological and non-rival domains, preparing institutionally and structurally laggard countries to catch up with those at the forefront"<sup>115</sup>.

To make these rules effective, the criteria should operate within an environment characterized by economic homogeneity, where internal and external disparities between countries are diminishing. Only in this environment can the currency union work smoothly and reach optimal results. The actual Maastricht Convergence criteria are based on Article 140 of the Treaty of Functioning of the European Union, shown in the table below.

Table 2: Maastricht criteria.

What is measured?	Price stability	Sound public finances	Sustainable public finances	Durability of convergence	Exchange rate stability
How it is measured?	Consumer price inflations rate	Government deficit as % of GDP	Government debt as % of GDP	Long-term interest rate	Deviation from a central rate
Convergence criteria	Not more than 1.5 percentage points above the rate of the three best performing Member States	Reference value: not more than 3%	Reference value: not more than 60%	Not more than 2 percentage points above the rate of the three best performing Member States in terms of price stability	Participation in ERM II for at least 2 years without severe tensions

Source: European commission

Given the complex change it brings for the economy, the process of Euro-adoption is gradual. First, a candidate country must be accepted to Exchange rate mechanism II (ERM II) for at least 2 years, which is also a time to fulfill four Maastricht criteria. An exchange rate between a country's currency and the Euro is agreed upon the ERM II entrance; afterwards the currency may fluctuate +/- 15% around this rate. Regarding these requirements, the V3 could not declare a target date, nor fulfill the convergence criteria to enter the ERM II system.

115 Afxentiou, Panos C. (2000), Convergence, the Maastricht Criteria, and Their Benefits. The Brown Journal of World Affairs, Winter/Spring 2000 – Volume VII, Issue 1, 10, 2000

The convergence criteria are changing every year. To compare V3's economic situation, it is best to compare the data for years 2013 and 2014, with reference values set for Lithuania, being in the ERM II before euro-adoption in 2015.

Table 3: Convergence criteria comparison.

	HICP inflation rate	Budget deficit to GDP	Debt-to-GDP ratio	Long term interest rates
Reference values 2013	<b>Max. 2.7%</b>	<b>Max. 3%</b>	<b>Max. 60%</b>	<b>Max. 5.5%</b>
Reference values 2014	<b>Max. 1.7%</b>	<b>Max. 3%</b>	<b>Max. 60%</b>	<b>Max. 6.2%</b>
Czech Republic 2013	<b>1.38%</b>	<b>1.25%</b>	<b>45.18%</b>	<b>2.11%</b>
Czech Republic 2014	<b>0.42%</b>	<b>1.95%</b>	<b>42.75%</b>	<b>1.58%</b>
Hungary 2013	<b>1.71%</b>	<b>2.5%</b>	<b>77.3%</b>	<b>5.92%</b>
Hungary 2014	<b>0.02%</b>	<b>2.6%</b>	<b>76.9%</b>	<b>4.81%</b>
Poland 2013	<b>0.82%</b>	<b>4.0%</b>	<b>55.7%</b>	<b>3.02%</b>
Poland 2014	<b>0.10%</b>	<b>3.2%</b>	<b>50.1%</b>	<b>2.52%</b>

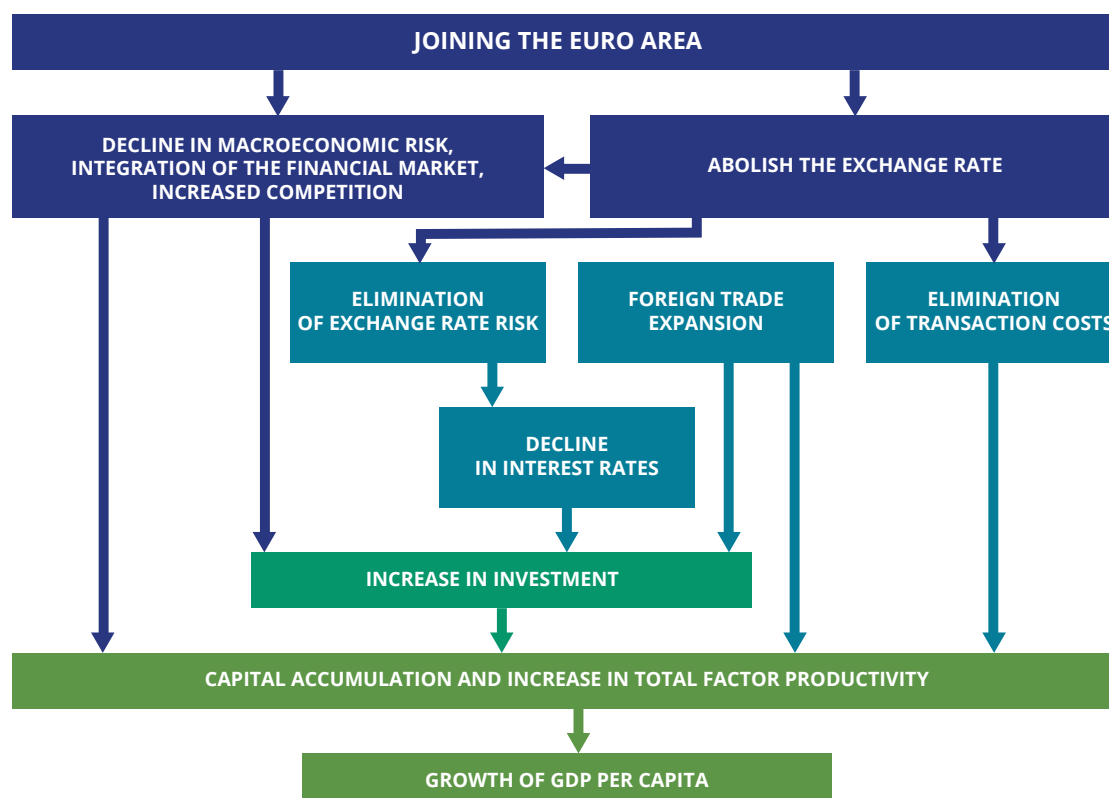
Source: European Central Bank, Statistics Bulletin, Developments outside the Euro area

Data shows that Poland and Hungary do not meet the criteria, whereas the Czech Republic does. However, the sentiment of society and politicians towards accepting the Euro is rather negative.

### 4.3 Benefits of Euro area membership

Academic literature on the theory of optimum currency area (OCA) considers benefits from the adoption of a single currency by deriving the elimination of transaction costs, exchange rate risk, a better performance of money by exchange and as a unit of account <sup>116</sup>. In theory, joining a single currency area should lead to decline in macroeconomic risk, deeper integration, expansion of foreign trade, and consequently, increase in investments, total factor productivity (TFP), and finally, boost GDP growth.

Figure 1: Benefits underlying the euro adoption.



Source: Borowski J. et al., A Report on Costs and Benefits of Poland's Adoption of the Euro, Warsaw, 2004

116 R.A. Mundell, A Theory of Optimal Currency Area, The American Economic Review, Vol. 51, No. 4, 1961



We can divide benefits into two areas: (1) direct effects, (2) long-term benefits. Direct effects occur in the short-term as a result of the one-off change in business condition associated with introducing the single currency. Long-term benefits are only potential and are widely discussed. Additionally, the global financial crisis has shown how overvalued some of the potential profits might be.

First, let us consider the direct, short-term effects. Eliminating transaction costs incurred by households and enterprises in relation to the exchange rate is the most obvious benefit of the single currency. It is also one of the most overestimated factors in relation to the private sector. The development and integration of the financial markets in a highly competitive environment resulted in significant reduction in exchange operations and costs of hedging. Nowadays, companies could easily and efficiently manage foreign exchange risk by engaging in various financial instruments <sup>117</sup>.

Among those aspects we have: elimination of exchange-rate risk (short-term) and higher investment rate (long-term). On one hand, a single currency can remove uncertainty, improve business conditions and investment planning, and support the optimal use of resources. On the other hand, free exchange rate, hence depreciation of the local currency, was a crucial supporting factor among the V3 countries for the economy during the global crisis. If we consider foreign currency risk a serious threat for the Czech Republic, Hungary, and Poland, then it could be household's high exposure on mortgage loans in foreign currency. However, the risk for these countries declined due to political moves. Hungary introduced loan conversions and similar steps are being undertaken in Poland; in the Czech Republic this is a marginal issue <sup>118</sup>.

A frequently appearing argument of long-term benefits of the Eurozone membership is an increasing investment rate, mainly due to low interest rates. Lower lending rates led to over-investment, mainly in PIGS (Portugal, Ireland, Greece, Spain) countries, causing an unstable economic boom. Independent monetary policy provides flexibility in realizing central bank targets. Current interest rates of central banks in V3 are on relatively low levels – Czech Republic 0.05%, Hungary 1.35%, Poland 1.5% (ECB rate is at 0.05%). The potential upside from decreasing rates shouldn't be significant.

Other benefits include long-term trade increase, decline in macro-economic risk of the country (higher rating), integration of the financial market, and increased competition (more effective resource allocation). It's hard to prove that a single currency zone accelerates real convergence in the Euro area. There is evidence of divergence among the early adopters, like Spain and Portugal, or even increased income gaps (Greece) regarding the average <sup>119</sup>. Meanwhile, the late joiners, such as Baltic countries (Slovakia, Estonia, Latvia and Lithuania), recorded the highest convergence among the EU countries, according to the ECB<sup>120</sup>.

## 4.4 Risks and costs of introducing the Euro

A country that abandons its own currency must be familiar with some costs and potential risks. The primary cost is losing an autonomous monetary policy, preclusive control of interest rate policy, and exchange rate policy. There are also costs associated with the participation in the single currency area – the one-time costs of currency changeover. Some papers highlight the risk of rounding up prices and increasing inflation. According to the data relevant for Baltic countries and Slovakia, regarding the Euro adaption, the estimated inflation was at 0.1 to 0.3 percentage points higher. In Lithuania, which joined the euro area on 1 January 2015, it does not appear to have made any impact on the overall price index<sup>121</sup>. Before elaborating on the most important issue in a single currency regime, the loss of monetary policy independence and potential risks associated with that, it is worth recalling five specific conditions required by an optimum-currency area. These conditions are concerned with the degree of<sup>122</sup>:

117 Best practices: Foreign exchange risk management, J.P.Morgan, 2012

118 A. Byrne, Hungary agrees official foreign exchange mortgage conversion rate, Financial Times, Nov 9, 2014; M. Waldoch, Polish Bill on Swiss Franc Loans Stalls, Prolongs Risk for Banks, Bloomberg, 2015

119 ECB 'disappointed' with lack of convergence in euro area, 30 Jul 2015, <http://www.euractiv.com/sections/euro-finance/ecb-disappointed-lack-convergence-euro-area-316696>

120 ECB, Real convergence in the euro area: evidence, theory and policy implications, 2015

121 Euro area: State of play in Lithuania after joining the Eurozone, European Commission, [https://ec.europa.eu/commission/2014-2019/dombrovskis/announcements/euro-area-state-play-lithuania-after-joining-eurozone\\_en](https://ec.europa.eu/commission/2014-2019/dombrovskis/announcements/euro-area-state-play-lithuania-after-joining-eurozone_en)

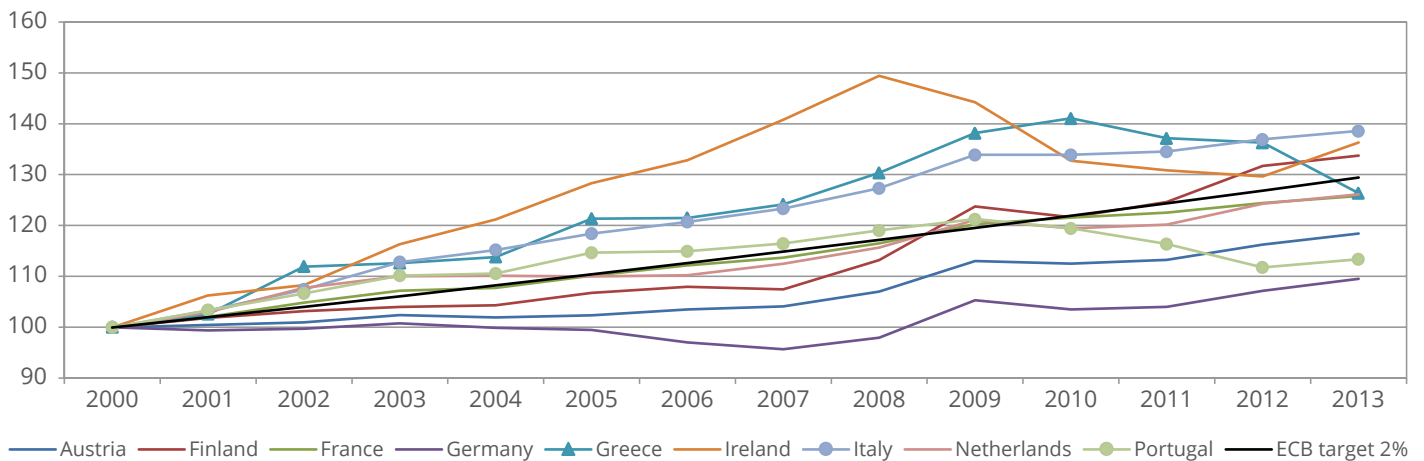
122 J. Nellis, C. Alexiou, Is the 'EURO' a Defunct Currency?, International Journal of Economics and Finance Issues, 2012

1. Price and wage flexibility,
2. Financial market integration,
3. Factor market integration,
4. Goods market integration,
5. Macroeconomic policy co-ordination and political integration.

It is perceived positively, when countries have similar levels of development, inflation rates, and business cycles. A fulfillment of these conditions builds the foundations for an economy, without independent monetary policy. Thanks to those, it is possible to respond to various shocks by automated balancing mechanisms that stabilize prices, employment, and balance of payments <sup>123</sup>.

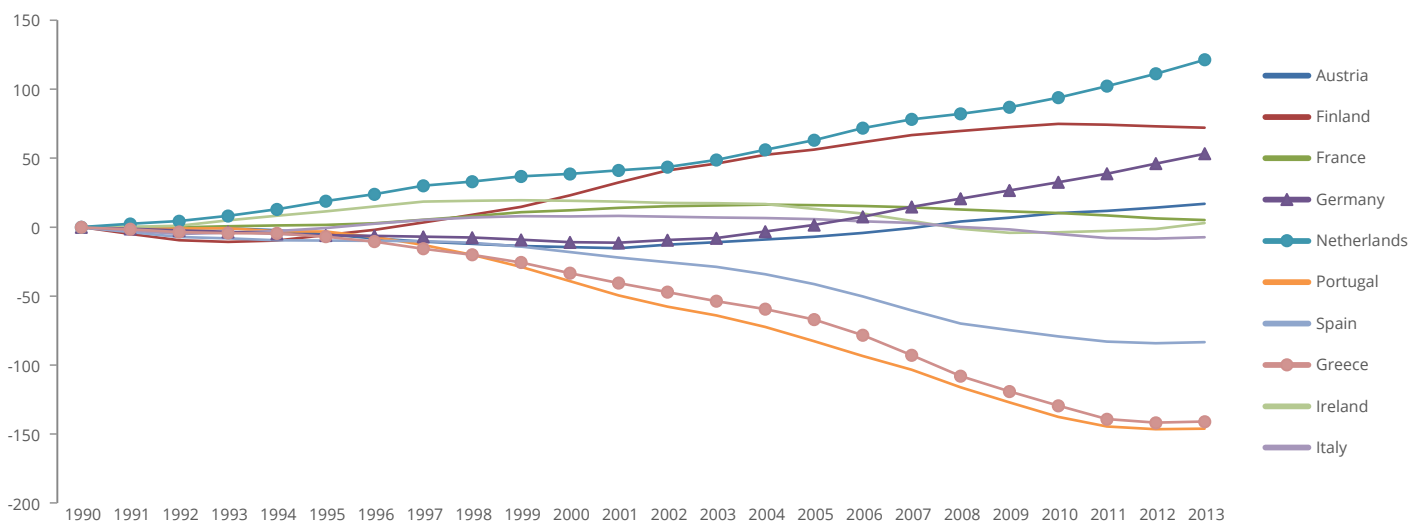
The EUR history does not lack negative examples, like the PIGS countries, where rapidly decreasing interest rates led to a boost of private consumption rate and an increase in indebtedness. The so-called "Wealthy North countries" financed investment bubbles in PIGS countries, where ULC (unit labour costs) rose rapidly. This factor caused a gradually melting competitiveness and the rise of inequalities between the Southern and Northern Eurozone countries.

Figure 2: ULC for selected Eurozone countries and ECB inflation target, 2000=100, 2000-2013.



Source: based on OECD data

Figure 3: The cumulative current account balance as % of GDP, 1990-2013.



Source: based on IMF data

123 L.A. Ricci, A Model of an Optimum Currency Area, IMF Working Paper, 1997

To conclude, a loss of independence in monetary policy may be a serious issue because of the fix exchange rate and a lack of possibility to appropriately respond to new market challenges. The ECB leads its monetary policy in line with the core countries, which can lead to further bubbles of various kinds. Decreasing currency during financial crisis was one of the major, if not the most significant factor, supporting the economy of Visegrad countries (especially in case of Poland and Hungary).

## 4.5 What we can learn from Slovakia's Euro adoption?

Slovakia adopted euro on 1st January 2009, with huge success, as it marked the next step in its European integration and was achieved before its immediate neighbours from V4. For Slovakia and international investors, the adoption of the Euro meant lower transaction costs and exchange rate risk. The repeatedly mentioned drawback of Euro being loss of monetary sovereignty was considered to have little significance to Slovakia because of the small size of its economy and deregulated capital inflows from abroad. Introducing the Euro in Slovakia also has a non-economic dimension associated with the stronger position on the European arena and the next step towards closer integration. Let's look at the Slovak macroeconomic statistic development before and after the Euro-adoption to see the implications of its adoption.

Table 4: Slovakia basic macroeconomics data.

	2007	2008	2009	2010	2011	2012	2013
Deficit in % GDP	-1.9	-2.3	-7.9	-7.5	-4.1	-4.2	-2.6
Debt (% of GDP)	29.9	28.2	36.0	40.8	43.3	51.9	54.6
Inflation (in %)	1.9	3.9	0.9	0.7	4.1	3.7	1.5
Real GDP growth in %	10.8	5.7	-5.5	5.1	2.8	1.5	1.4
Unemployment in %	11.2	9.6	12.1	14.5	13.7	14.0	14.2
Export in mio Eur	47 351	49 522	39 721	48 272	56 783	62 144	64 172
Import in mio Eur	48 076	50 280	38 775	47 494	55 768	58 589	59 940
FDI in mio EUR	3 581	4 687	-4	1 327	2 500	2 323	445

Source : Eurostat, UNCTAD

In the year of Slovak Euro-adaptation, expectations for new investments and export increase quickly diminished, as the whole world was facing an economic crisis, which also dragged Slovakia into recession. During the crisis, we could see the biggest euro disadvantage, the loss of sovereign monetary policy with the possibility to devalue the national currency. It is often argued, based on the example from Poland and its Zloty depreciation, if Slovakia remained with its own currency, the drop in GDP would not have occurred<sup>124</sup>. However, the other problem was a high conversion rate, which resulted from 2 years of continuous appreciation, when the Slovak crown strengthened by over 20% against the Euro. The tested solution to compensate the loss of monetary policy was represented by active fiscal policy and flexible labour and product markets. As a result, the public finance deficit jumped from 2.3% of GDP in 2008 to 7.9% of GDP in 2009 and 7.5% in 2010.

The above mentioned disadvantages of the Eurozone are outbalanced by the advantages this membership includes, especially for small countries as Slovakia. The biggest pros are the stability of monetary policy, a stable currency, and inflow of foreign direct investments (FDI) that were very inconsistent (as shown in the table above). Also, the diminishing transaction cost for trade within the European Union, where Slovakia is exporting around 85% of all its export good and services.

Slovakia's path to the Eurozone was difficult, paved with sacrifices and needs for quick and effective reforms, privatisations, deregulation of some industries, and other different steps that, at the end, bore desired fruits, even though some may say that changes occurred too quickly. Slovakia went from a country not even invited to accession talks with EU with rest of the Visegrad Group and not accepted

124 A. Torój, Poland and Slovakia during the crisis : would the euro (non-)adoption matter ? „MF working paper series“ 13, 2012

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to NATO or OECD, to a country that has met Maastrich criteria and adopted Euro. It continued in what it knew the best - exporting oriented policy and attraction of new investors. Now, it has another big step ahead, to figure out how to build economy with high added-value production, enabling it to keep its edge.

The takeaways for V3 from Slovakia's Euro adaption are ambiguous and deliver limited guidance. The main implication, however, is that costs and benefits of adopting the Euro largely depend on the profile and structure of a country's economy. As discussed before, there are different opinions on monetary unions and their benefits. Despite the unfavorable global macroeconomic environment, Euro adoption in Slovakia is considered, by many economists, an unexpected success story, and the last data confirm this thesis.

## 4.6 Our view on the Visegrad countries in the Eurozone – Recommendation

All of the V4 countries committed to join the Euro area, but so far, only Slovakia adopted the Euro. Being a member of the Eurozone is associated with many benefits and costs. The global financial crisis has revealed some of the potential risks associated with the Euro, especially related to the lack of independent monetary policy. However, Slovakia shows the profound economic reforms it has implemented before the Euro adoption, including economic deregulation and increased openness for foreign investments, spur economic growth. One of the biggest fears, the rising prices connected with introducing the common currency, has been empirically disproven, which is coherent with Slovakia's case. Furthermore, the introduction of the euro in Slovakia had a large political dimension, associated with the next step towards closer integration and the stronger position in the European area.

Considering V3, it is worth saying that Slovakia is the smallest and most open of the Visegrad economies, with a ratio of trade to GDP of 180 percent (Hungary 171%, Czech Republic 161%, and Poland 94%, according to World Bank data, 2014). Therefore, due to different sizes and structures of the economies, price, and wage flexibility, level of integration with the EU, and openness of the economies, each country should analyze respective aspects of accession to the Eurozone separately

Bearing in mind all pros and cons of a single currency and the current political and economic situation in the Eurozone, **we recommended to refrain from entering the Eurozone in the foreseeable future.** The main factors standing behind this are not enough economic flexibility, insufficient adjustment mechanisms, and the risk of losing the independent monetary policy, which seem to be significantly important for the economies of V3. Additionally, the current economic situation and unresolved issues (for e.g. Greece) in the Eurozone increase the uncertainty about the future path of the Euro area. We should also remember there is no uniform approach towards all of the Visegrad Group, and the decision on the accession should be analyzed by each country separately.

Despite our view, **we have further recommendations, which will be useful for the V3 for the next 25 years:**

- Fulfillment of the Maastricht criteria (excl. ERM II). Suitable and stable fiscal policy with stable prices should be implemented (with the implementation of the relevant stabilization mechanisms);
- Increase of structural competitiveness and gradual changes in the structure of the economy, aiming at production of goods with higher value added (achieve better position in the value added pyramid – from the supplier to the producer);
- Increase smart and effective investments in innovativeness activity (change direction of the economies competing mainly through labor costs);
- Take steps towards more flexible labor markets with higher factor and goods market integration (conditions required by an optimum-currency area);
- Deregulation and activities for more open economy;

- 
- Pro-business regulations (and systematically promotion in Doing Business ranking);
  - Limiting government interference and reduction of state in the economy (which significantly spoils the investment climate);
  - Activities towards a more favorable environment for investments - adequate support system and incentives for investors.

Our conclusion is straightforward; the V4 non-euro countries should catch up with European countries through appropriate policies. In our view Hungary, Czech, and Poland should not join the Eurozone in the foreseeable future. The Eurozone is struggling with various issues, which it should solve before it expands its members. Before the Euro adoption, the V3 countries should strengthen their economic foundation by introduction of structural reforms and increase of efficiency of its institutional frameworks. As shown by the experience of other countries in recent years, the chance to accelerate economic growth permanently and increase wealth after the adoption of the Euro **largely depends on preparation of the economy – and V3 countries should focus on these aspects in next years.**

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## 5. THE FUTURE OF ENERGY

Joanna Rycerz

### 5.1 Executive summary

Increasing cooperation between V4 Countries in terms of energy is crucial. Both electricity and gas sectors need new capacities in cross-border infrastructure, common markets, and improving investments in new technologies. Therefore, energy cooperation between V4 Countries should aim at implementing joint energy policies, providing secure supplies of natural gas, creating cross-border electricity and gas markets, and developing new technologies.

#### 5.1.1 Natural gas

V4 Countries are more dependent on gas from one supplier than countries from Western Europe. Therefore, cooperation between V4 Countries should aim at further diversifying supplies and developing regional gas markets. Those changes should be done gradually with strong political regulatory support, initially, and cooperation between companies and other market participants, in five core areas:

- **Cross-border infrastructure.** Sufficient infrastructure is a basis for further integration of gas systems. V4 Countries should aim to increase cross-border gas transit capacities within V4 Group and with other regional groups, in particular BEMIP (which may prevent V4's isolation).
- **Regulatory framework.** V4 Countries should take efforts to create a market-friendly environment on national and regional level. This requires harmonisation of existing and (if necessary) establishing new regulations that will facilitate cross-border flows of natural gas. In particular, V4 Countries should provide full and proper implementation of Network Codes and a coordinated, active approach on EU level, while establishing new ones.
- **Increase competition on gas markets.** Changes in regulatory framework should be aimed to increase competition and facilitate regional cooperation. As the first step, V4 Countries should complete the liberalisation of national gas markets by full unbundling of vertically integrated incumbents on national gas markets (unbundling of infrastructure, distribution, storage and supply activities).
- **Alternative sources of supply.** V4 Countries should increase access to alternative sources of supply: LNG and other pipeline supplies (it may require support for TAP, TANAP projects). Due to V4's geographical position, it may be difficult to achieve total independence from Russian gas supplies. However, even minor access to alternative sources may improve V4's bargaining position and decrease potential effects of disruption in supplies.
- **Regional market.** With sufficient cross-border infrastructure, diversified sources, and routes of supply, and with market-friendly regulatory framework, V4 Countries will be best placed to launch a well-functioning regional gas market. This change will bring new quality in V4's gas sector - liquid regional market will attract new market players and diminish political influences on gas trading operations. At this step, establishing a joint platform for gas trading may be helpful.

Increasing the regional cooperation may face several limitations related with the business nature or lack of will for cooperation between companies responsible for maintaining the infrastructure. Therefore, during the whole process, close cooperation between energy regulators and companies will be crucial.



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## 5.1.2 Electricity

Over the past years, the share of electricity produced in renewable energy sources has increased. Electricity generated in RES is intermittent and unpredictable, and in certain situations, the national electricity system may not be dispatched to it (which may cause unplanned electricity flows between two countries). A solution for maintaining stable electricity systems (but ensuring investments in RES) may be closer regional cooperation. In terms of electricity, V4 Countries have the potential to cooperate in three core areas:

1. Increase of cross-border electricity supplies. We observe that V4 Countries have the potential for joint cooperation in terms of electricity. However, it is not as obvious as in terms of natural gas. More interconnected countries can establish a single electricity market within V4, with a joint trading platform (for balancing and trade purposes). Trade activities should be facilitated by creating single licenses for trade in electricity.
2. Decentralised renewable generation. In many EU Countries, Renewable Energy Sources (RES) development is driven by public financial support available for companies operating on national level in support schemes. V4 Countries may consider coordinating investments in RES (e.g., in joint RES support scheme) and, therefore, decrease level of RES subsidies born by single countries and the risk of low investments in the RES sector.
3. Greater digitalisation of electricity systems. Digital solutions in the energy sector may give precise information determining the optimal location of a new plant, reduce costs of operational management during electricity production (e.g., dedicated software will allow for better management of RES production and storage), and improve balance demand with the most affordable supplies (when combined with demand-side management tools).

Similar to the conclusions presented for natural gas, above changes will be done gradually, with strong political regulatory support, to facilitate the cooperation between companies and other market participants.

## 5.1.3 Coordinated energy policies

All the ideas presented above aim to increase the cooperation between V4 Countries in the energy sector and may be implemented simultaneously with EU-wide solutions, like the Energy Union. The coordination of V4s' energy policies is a milestone for making V4s voice more visible on EU level.

We welcome European Commission's proposal that EU Member States should cooperate in developing their energy policies and conduct regional consultations on their energy and national climate plans as a part of the new system of governance in the Energy Union. Such regional cooperation may help to identify common goals under regional long-term regional energy and climate strategy and increase the predictability of investments. Strong regional cooperation between V4 Countries will allow for achieving important energy goals more efficiently, and a stronger Visegrad would, eventually, translate into a stronger European Union.

This section presents our vision for V4 cooperation in the energy sector. We are convinced that several opportunities for joint development of the energy sector exist in the Visegrad region. As a matter of fact, although we see the differences between our countries, the common objectives should prevail, especially related to security of supplies, environment protection, sustainable development, and energy efficiency. Through joint cooperation between governments and companies, the V4 Countries could improve their gas and electricity markets. Both these sectors need new capacities in cross-border infrastructure, the existence of common markets, and investments in new technologies. **In the following paragraphs, we present solutions for cooperation between V4 Countries in establishing joint energy policies, providing secure supplies of natural gas, creating cross-border electricity and gas markets, and developing new technologies.**

The energy markets in V4 Countries are at a similar stage of development<sup>125</sup>. V4s' economies represent higher energy intensity than EU average (per GDP), so secure and efficient supplies of energy, with access to diversified sources, at an affordable price are vital for their proper functioning. We define the security of supplies as access to sufficient supplies of energy at affordable cost. This definition could be further divided into three core elements:

- security of physical supplies provided by sufficient infrastructure and diversified suppliers;
- purchase security provided by ability to purchase energy; and
- political security, provided on national, regional, and global level.

Looking at these elements leads us to a conclusion that, in our intertwined world, energy security is no longer a national issue. Increasing interconnectivity and complexity of energy systems require solutions going far beyond national borders.

## 5.2 The similarities of V4's energy mixes, supply dependency, and stage of market development may act as a foundation for further cooperation

The V4 countries rely on fossil fuels (coal, gas, oil) twice more than EU average, while renewable energy sources represent a smaller share of their energy consumption.

Figure 1: The V4 average mix

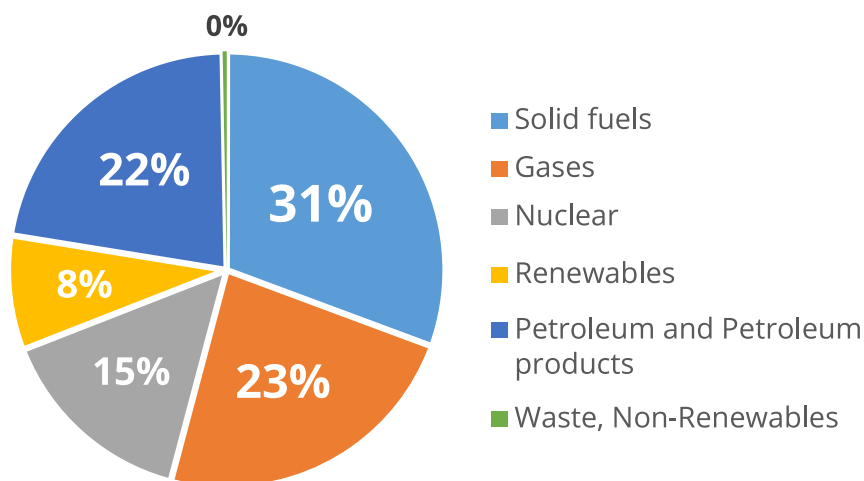
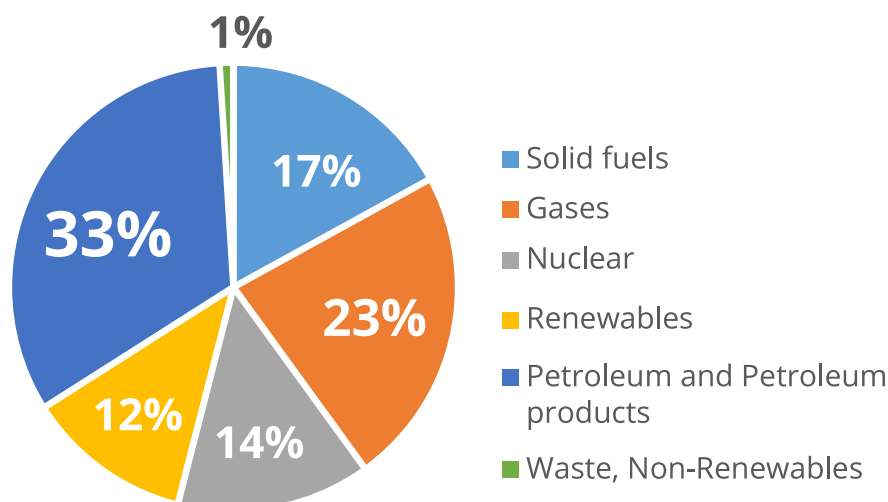


Figure 2: EU28

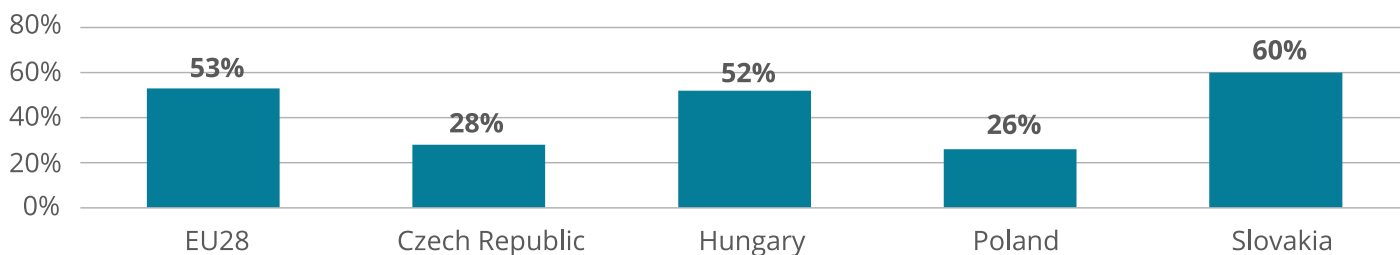


Source: Eurostat (2013), European Commission (2015)

125 Energy markets in Countries of V4 Group may differ e.g. in import dependency and energy mix.

The V4 Countries are also more dependent on gas from one supplier than countries from Western Europe. Large volumes of natural gas are imported from Russia. The more significant this import is for national consumption, the higher the price paid. The dependency on gas imports from one supplier, with limited access to alternative supplies, results in restrictions in switching into alternative roads of supplies. In some situations, cooperation with one supplier may be economically viable; however, in case of V4, this dependency from Eastern supplies is not a matter of choice. In recent years, the situation improved due to new interconnector for reverse gas flows between Czech Republic and Slovakia, Czech Republic and Poland, and between Slovakia and Austria or between Slovakia and Hungary. New interconnection between Slovakia and Poland will be built between 2018 and 2020.

Figure 3: Total energy net imports - % of gross inland consumption

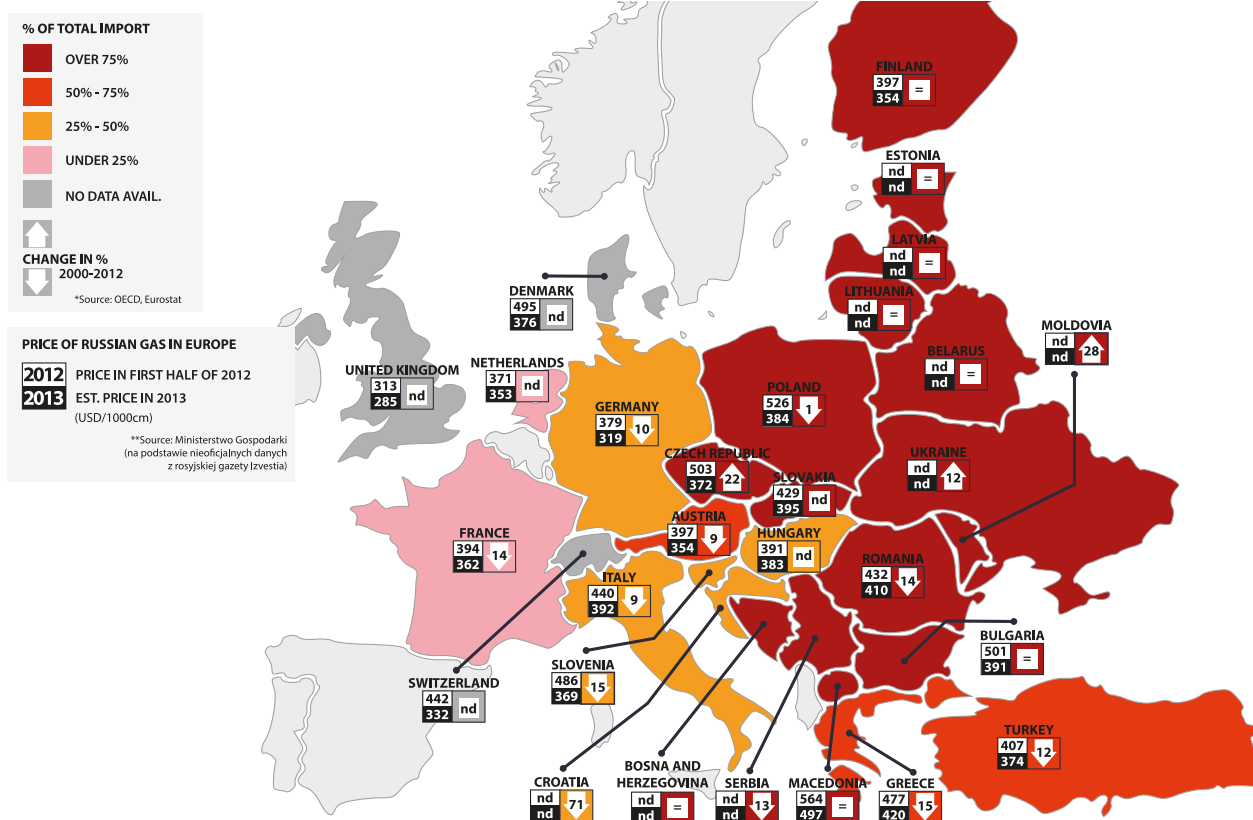


Source: Eurostat (2013), European Commission (2015)

## COMMENT

Energy security is one of top priorities in national policies of the V4 countries. Therefore, common approach and cooperation in the area of energy infrastructure, particularly gas interconnections, and RES is crucial for stable development of the region. The solutions, presented by this report, give a clear framework how to set-up a functioning regional market, which will be less “politically” volatile.

Jan Bocora, Ph.D.



Source: Polish Ministry of Economy/Leśław A. Paga Foundation (2014)

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## 5.3 Providing secure supplies of natural gas is one of the core areas for cooperation of V4

In our opinion, cooperation between V4 Countries should aim at development of the regional gas market. This change may be done gradually with strong political regulatory support, initially, and cooperation between companies and other market participants, in a five core areas:

- 1. Cross-border infrastructure.** Sufficient infrastructure is a basis for further integration of gas systems. V4 Countries should aim to increase cross-border gas transit capacities within V4 Group and with other regional groups, in particular BEMIP (it may prevent from V4's isolation). Intergovernmental cooperation and support from EU administration and financing will be crucial at this stage.
- 2. Regulatory framework.** V4 Countries should take efforts to create a market-friendly environment on national and regional level. This requires harmonisation of existing and (if necessary) establishing new regulations that will facilitate cross-border flows of natural gas. In particular, V4 Countries should provide full and proper implementation of Network Codes and a coordinated, active approach on EU level, while establishing new ones.
- 3. Increase competition on gas markets.** Changes in regulatory framework should be aimed to increase competition and facilitate regional cooperation. As the first step, V4 Countries should complete liberalisation of national gas markets by full unbundling of vertically integrated incumbents on national gas markets (unbundling of infrastructure, distribution, storage, and supply activities).
- 4. Alternative sources of supply.** V4 Countries should increase access to alternative sources of supply: LNG and other pipeline supplies (it may require support for TAP, TANAP projects). Due to V4's geographical position, it may be difficult to achieve total independence from Russian gas supplies. However, even minor access to alternative sources may improve V4's bargaining position and decrease potential effects of disruption in supplies.
- 5. Regional market.** With sufficient cross-border infrastructure, diversified sources and routes of supply, and with market-friendly regulatory framework, V4 Countries will be best placed to launch a well-functioning regional gas market. Liquid regional market will attract new market players and diminish political influences on gas trading operations. At this step, establishing a joint platform for gas trading may be helpful.

Increasing regional cooperation may face several limitations related with business nature or lack of will for cooperation between companies responsible for maintaining infrastructure. Therefore, during the process, close cooperation between energy regulators and companies will be crucial.

### 5.3.1 Need for cross-border infrastructure and access to new sources of supply

Maintaining the existing dominance of a single supplier may bring negative consequences for the whole region in long-term perspective, including higher prices and economic and political impacts. Change of this status quo is strongly supported by European Commission. EC, during Stress Tests in 2014, came to the point that disruptions in gas supplies would have a substantial impact on Central and Eastern Europe, due to lack of infrastructure and alternative supplies, but a cooperative, market-based approach will enable easier gas flows between neighbouring countries<sup>126</sup> and, therefore, bring security. From our point of view, V4 cooperation will be addressing EC's recommendations.

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126 Q&A on Gas Stress Tests, European Commission (2014).

We know of ongoing amendments to the Regulation concerning measures to safeguard the security of gas supply(994/2010/EU)<sup>127</sup> that assume establishing special areas in case of gas disruptions. However, an initiative of V4 Countries may be complementary to EC proposal and provide another way of diversification, tailored to regional level needs.

### 5.3.2 Pipeline supplies

Investments in infrastructure are time- and cost-consuming (cost of PLN-CZ gas interconnector “Stork II” exceeds EUR 63 M); therefore, V4 Countries should try to increase interconnection capacity by sharing costs of new pipeline infrastructure (costs may be shared between TSOs with support from EU funds). New investments may aim to complete North-South Gas Corridor in CEE that will link the LNG Terminal in Świnoujście, through central Poland, the Czech Republic, Slovakia and Hungary, and the Adria LNG terminal in Croatia on the Krk Island (the Corridor will comprise domestic gas pipelines with total length over 1300 km<sup>128</sup> and costs over 3.7-4.2 billion EUR<sup>129</sup>).

An important thing is that crucial cross-border energy infrastructure (included in Trans-European Energy Infrastructure (TEN-E) development plan) may apply for the status of Projects of Common Interest (PCI) and receive financial support Connecting Europe Facility. Projects for investments in necessary infrastructure may be submitted by regional groups. Regional groups may be established between member states, national regulatory authorities, project promoters, and relevant stakeholders (e.g., transmission system operators).

For developing gas cross-border infrastructure, V4 Countries should bring efforts to establish the next regional group and submit proposal of necessary investments for the next call for PCI in 2017. Based on past experiences from Gas Regional Initiative South-South East operating under ACER or group dedicated to V4 issues operating under EC’s DG ENER, it is likely that V4 Regional Group, established under existing cooperation within EU bodies, will successfully operate without need for additional administrative bodies.

#### Example

List of PCIs in 2015 included a set of PCIs for investments in gas infrastructure in the Eastern Baltic Sea region under Gas Baltic Energy Market Interconnection Plan (BEMIP).

V4 Countries should establish a regional group for the purpose of infrastructure development, similar to NSI East Gas Regional Group (established in 2013 for the purpose of gas interconnections allowing bidirectional flows between Poland, Czech Republic, Slovakia and Hungary, linking the LNG terminals in Poland and Croatia).

Source: ACER

### 5.3.3 Access to supplies of liquefied natural gas (LNG)

Access to LNG, provided by Terminal in Świnoujście, will allow V4 Countries to limit dependency on Russian gas and participate in global market, with a wide range of suppliers and flexible prices.

In recent years, global LNG trade is growing rapidly; it reached a level of 241.1 MT in 2014 with a 4 MT increase over 2013<sup>130</sup>. With increased trade, we may observe decrease in LNG prices (see chart below). This situation is caused, mostly due to expansion of global LNG supplies and decrease of oil price (LNG prices are often indexed to oil prices). Nowadays, due to price differences, most of the world LNG volumes are directed to the Asian markets, but some European companies are negotiating LNG supply

127 Proposal for a Regulation of the European Parliament and of the Council concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010, European Commission (2016).

128 Completing Europe. From the North-South Corridor to Energy, Transportation, and Telecommunications Union, Atlantic Council and Central Europe Energy Partners, Grupa LOTOS S.A., Przedsiębiorstwo Eksploatacji Rurociągów Naftowych S.A., PERN “Przyjaźń” (2014).

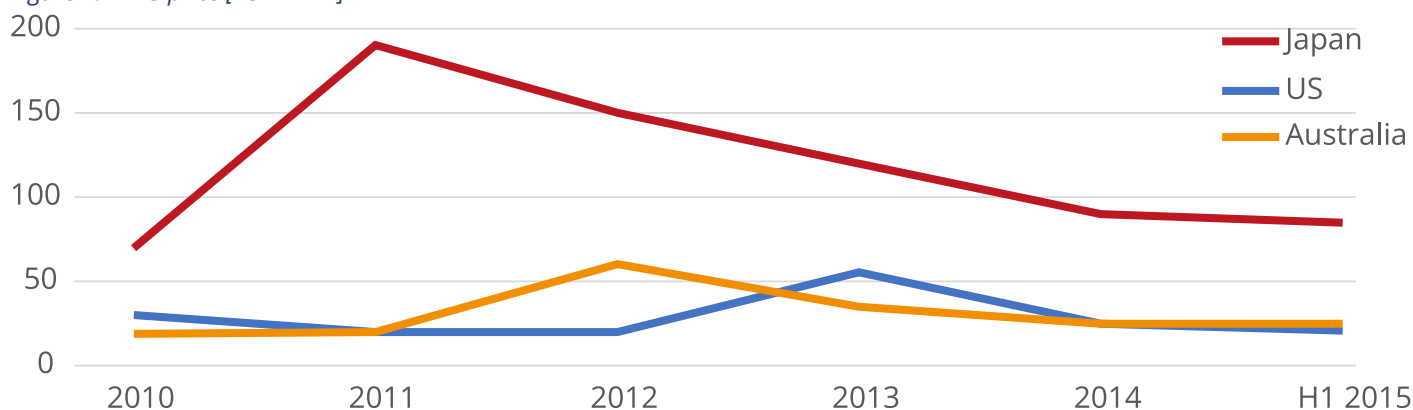
129 Completing Europe. From the North-South Corridor to Energy (as before).

130 World LNG Report - 2015 Edition, International Gas Union (2015).

contract with US LNG producers. New LNG supplies from Northern America, Australia, Qatar, and new discoveries in East-Africa are likely to increase the size and liquidity of the global LNG markets and make LNG a major source of diversification.

For the above reasons, in a short-time perspective, we may expect an oversupply of LNG, but resources of this fossil fuel and liquefaction plants are limited; therefore, in a long-term perspective, prices of LNG will rise again. However, looking in long-term perspective, LNG market will be tightened due to increased global demand that could be higher than global level of supplies (assumed that due to physical conditions, export LNG terminal cannot be built on every gas field). We should remember that in long-term perspective, global supply-demand balance in LNG market will be tightened.

Figure 4: LNG price [EUR/MWh]



Source: European Commission (2015)

LNG may be used by V4 Countries as back-up fuel for traditional gas pipeline supplies, a source for diversification of current gas supplies for V4 Region in case of short-term disruptions. LNG is supplied to terminals by ships and then by trucks or (after regasification) through existing pipelines. This supply chain provides greater flexibility, because gas can be easily delivered to the areas with limited access to pipeline supplies. Recent EU strategies assumes increasing use of LNG as an alternative fuel in heavy transportation, e.g., trucks and ships, which may constitute another field for cooperation for gas companies within V4. With joint development of a map of LNG stations and storage plants, V4 Countries may increase in a short-term security of diversified supplies.

### 5.3.4 Creating a regional gas market within V4

Investments in cross-border infrastructure and alternative sources of supply increases connectivity and allows for creating a single gas market within V4. The idea of a single market (in any form of its implementation) assumes maximum convergence of gas prices (excluding national taxes) between countries of the region. Price created on liquid regional gas market may act as a reference price for gas supplied to this region.

Creating a regional gas market requires political decisions and strong cooperation between energy regulators, especially abandoning administrative price regulation. In Slovakia, household and SME gas prices are strictly regulated and kept below (probable) market price. The price creation by sellers (there are around 20 independent gas sellers) is limited to very rigid tariff systems, which does not allow for new innovative products. Such a situation discourages households and SMEs from actively searching for better products and makes the whole idea of energy market liberalisation useless. Liberalisation of national gas markets should be the first step towards regional market.

For developing a single gas market, V4 Countries should complete liberalisation of national gas markets – full unbundling of transportation, storage, distribution, and supply companies, and abandoning regulated process on wholesale market. V4 countries may follow guidelines on structural framework provided under Gas Target Model (this non-binding document has been developed by NRAs, TSOs, and stakeholders in cooperation with Agency for Cooperation of Energy Regulators (ACER) and provides



indicators of well-functioning markets with framework requirements). Establishing a regional market may be supported by EU administration, because reviewed Gas Target Model (2015) assumes inter alia integration of regional markets.

As the next step, V4 Countries should aim to establish a regulatory framework that will facilitate operating on the regional gas market. This set of market rules will increase market transparency and energy (both electricity and gas) trading, boost competition, and liquidity, and in consequence, attract new market players and suppliers.

Core regulations within V4 regional market must follow EU rules on gas grid operation - Network Codes (EU secondary law aimed to facilitate the harmonization and integration of European gas markets). Some of Network Codes are already adopted (e.g., Network Code on Capacity Allocation Mechanism<sup>131</sup>, Network Code on Gas Balancing of Transmission Networks<sup>132</sup>, or Network Code on Interoperability and Data Exchange Rules<sup>133</sup>) and V4 Countries should focus on proper implementation of above regulations. Negotiations on another Network Code on Harmonised Transmission Tariff Structures for Gas are ongoing, which creates another path for cooperation of V4 Countries (between TSO's and national energy regulators under GRI SSE).

Market integration will require strong cooperation on political and governmental levels, aimed to choose the best model for gas market integration. V4 Countries may consider several models of market integration, in particular: (i) single cross-border market zone, (ii) establishing V4 Trading Region, (iii) multiple coupled market zones, or (iv) development of independent connections to external liquid hubs.<sup>134</sup> With access to LNG supplies and increased interconnectivity, V4 Countries may consider establishing a single market zone with joint virtual trading point, where LNG supplies may provide upper price limit (excluding regional transit costs). This virtual trading point may be established as joint energy exchange (similar to Nord Pool Spot for electricity trading on SPOT market in Scandinavia). Market zone of a size of a total sum of Czech, Hungarian, Polish, and Slovakian gas markets would improve negotiating position of V4 countries and give ability for expecting lower prices and attracting new suppliers<sup>135</sup>.

### Case study

In 2014, PEGAS platform for gas trading in France and Germany was launched. Since 2015, PEGAS allows for trading activities in many European gas hubs: French PEGs, German EEX, as well as on Belgian Zeebrugge, Dutch TTF, British NBP, and Italian PSV. In 2015, PEGAS became the largest gas exchange in EU. On all hubs, PEGAS allows for trading on spot market (except PSV) and futures market. The second largest gas commodity exchange is British ICE (Intercontinental Exchange). ICE allows for acquiring gas on several European gas hubs: British NBP, Dutch TTF (ICE Index), and Belgian Zeebrugge.

V4 Countries may take a lesson from the most liquid European commodity exchanges and establish a single platform for gas trading within V4 Region.

To improve secure and resilient gas supplies, V4 Countries may consider implementation of single rules for gas storage obligation, similar to mechanism required by International Energy Agency of maintaining total oil stock levels equivalent to at least 90 days of the previous year's net imports. Existing national storage obligations should not limit cross-border trading activities (in Poland, storage obligation creates unnecessary market-entry barrier, because the cost of storage is imposed on suppliers importing natural gas to Poland) and should allow for keeping mandatory reserves in storage facilities in different countries within V4 Group. Storage capacity should be more available on a regional level; therefore, V4 Countries may consider creating bundled products (storage and transmission capacity), which could be traded on a regional platform.

131 Commission Regulation (EU) No 984/2013 establishing the Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems (NC CAM).

132 Commission Regulation (EU) 312/2014 of 26 March 2014 establishing a Network Code on Gas Balancing of Transmission Networks.

133 Commission Regulation (EU) 2015/703 of 30 April 2015 establishing a network code on interoperability and data exchange rules.

134 Analysis on V4 Gas Target Model has already been presented in Road Map towards the regional gas market among Visegrad 4 Countries (2013) and The Gas Target Model for the Visegrad 4 Region Conceptual Analysis (2013).

135 S. Ascari, The Gas Target Model in Central Europe: a Study of the V4 Region, European University Institute (2013).

### 5.3.5 Collective gas purchases

Despite recent political dimensions, V4 countries may consider implementation mechanism of collective gas purchases. Aggregated demand for gas within V4 Group reached 32 mtoe in 2013<sup>136</sup> (gas demand in France in respective period of time reached 38 Mtoe). Market of this capacity will attract new external suppliers and increase negotiating position of V4 with existing suppliers. Polish proposal (*Roadmap towards an Energy Union for Europe. Non-paper addressing the EU's energy dependency challenges presented in 2014*<sup>137</sup>) assumed two models of collective gas purchases: (1) top-down approach with engagement of special agency, or (2) bottom-up approach with engagement of commercial entity. The first solution may be implemented in voluntary participation of each country (with a possibility to purchase a certain share of its total domestic consumption) – for the countries not convinced of this solution. However, its side-effects may negatively affect competition. The second approach, assuming establishing voluntary consortium of interested companies, may be more beneficial, especially for large gas end-users. Entity established for trading purposes may be more transparent and less exposed to political pressures. Despite approach, each consortium established for collective gas purchases should fully comply with WTO rules and EU competition rules<sup>138</sup>, and its operation will be assessed by European Commission (due to intergovernmental powers, if wrongly operated, it may create inflexibilities and market disruptions).

If establishing proposed mechanism will raise controversies and resilience of certain countries, V4 Countries should implement unified standards in contracts for gas concluded by national and private enterprises.

#### Case study

Several mechanisms of joint purchases for energy products are already functioning.

An example of bottom-up approach is two Japanese electricity producing companies: Tokyo Electric Power Co. (TEPCO) and Chubu Electric Power Co. (CEPCO). They signed, in 2014, a preliminary agreement to establish a joint venture for the procurement of fossil fuel resources, especially LNG. JV Company, called JERA, was established as 50:50 partnerships and started operating from 1st October, 2015. Company is responsible for all procurements of thermal coal (20 mln tones yearly) and LNG (more than 10 mln tons is currently delivered under long-term contracts that will expire in 2020, and after that date, JERA will be entitled to negotiate new ones).

An example of top-down approach is Euratom Supply Agency (operating under Euratom), established for collective supplies of nuclear fuel.

In 2015, Lithuania and Latvia signed a governmental memorandum on collective gas purchases. The memorandum stipulates that countries will coordinate their gas purchases with one another and will cooperate in seeking alternate sources of gas, using LNG Terminal in Klaipeda. However, until now, no specific steps have been made.

136 Eurogas Statistical Report (2014).

137 Roadmap towards an Energy Union for Europe. Non-paper addressing the EU's energy dependency challenges, Ministry of Foreign Affairs of the Republic of Poland (2014).

138 Energy Union Factsheet, European Commission (2015).

## 5.4 Increasing potential of renewable energy sources and new technologies in electricity generation

### COMMENT

*Cooperation on energy issues successfully started in the V4 Group several years ago, mainly in the gas and electricity infrastructure development. The North-South Corridor is gradually being completed but in order to secure energy supplies in the close future, more effort is needed. Even if I cannot agree with all the suggestions stated in the report (e.g. the proposal for collective gas purchases), the report as a whole correctly addresses the most pressing issues. For instance, the identification of the need for more coordination in the infrastructure development and the need to integrate markets both in electricity and natural gas. Nevertheless, when it comes to electricity market integration, the report could elaborate more on the possibility of Poland joining the existing 4M Market Coupling. In the gas market integration area, the report could serve as a good starting point for future analysis on the gas target model in the V4 region.*

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*(Opinion expressed is those of the author alone and does not necessarily reflect or represent the views, policies or positions of the author's employer, the Ministry of Economy of the Slovak Republic)*

The model of electricity systems, based on closed national systems, is no longer actual. Over the past years, generation portfolio has changed and increased share of intermitted generation requires closer regional cooperation. Closed electricity systems are more exposed to risk of blackout. Poland may serve as an example, with its 2% interconnection capacity in electricity faced a risk of blackout in 2015. Therefore, cooperation on increasing cross-border electricity supplies, decentralised renewable generation, with its greater digitalisation will be core challenges for the future electricity systems.

We observe that V4 Countries have the potential for joint cooperation in terms of electricity; however, it's not such obvious as in terms of natural gas. More interconnected countries can create single electricity market within V4 with a joint trading platform (for balancing and trade purposes). Trade activities should be facilitated by introducing single licenses for trade in electricity. Another field for cooperation is changing generation portfolio aimed in development of RES generation, smart grids facilitating management of decentralised power plants, and consumer activities. Implementation of above solutions must be supported by cooperation of governments (especially in terms of licensing), national energy regulatory offices, and grid operators.

### 5.4.1 Need for cross-border electricity infrastructure

An existing model of electricity, based on closed national systems with several large power plants (mostly carbon-fuelled), is now transforming into a new model with a greater share of cross-border supplies and new market participants (self-producers, demand-side). Future electricity systems must be prepared for a greater share of generation from renewable energy sources (RES) and its back-up generation, self-producers of electricity, and for increased participation of demand side and electricity storage. Those new market participants will make a fundamental change for future electricity systems.

Greater share of RES and other intermittent electricity producers will require improved and more interconnected infrastructure across Europe. EU established two targets for increasing cross-border capacity in electricity: until 2020, each EU country should increase its interconnection capacity to 10%, and until 2030, this capacity should be extended to 15%. All V4 countries, but Poland, fulfilled the 2020 target. Poland, with its 2% interconnection capacity (based on 2013 Eurostat data), needs investments in new electricity grids over the borders with Czech and Slovakia. Similar to our analysis on the gas market, financial support for those investments may be acquired, i.e., from Connecting Europe Facility Fund.

## 5.4.2 Possibilities for integration of electricity markets

More connected systems between V4 countries can diversify and share electricity produced in RES. Poland, due to its geographical conditions, is one of the European leaders in wind electricity generation – total onshore capacity reached over 5 GW in 2015, and Polish energy companies are exploring the potential of offshore wind generation (due to strong winds over the Baltic Sea). In Hungary, good exposure to sunlight and geothermal energy created another opportunity establishing new RES plants and kinetic energy of water, which can be converted into electricity in small hydropower plants located, e.g., in Czech and Slovakia<sup>139</sup>.

From our view, the ability to import electricity produced in neighboring countries should be complemented by greater integration of energy markets within V4 Group and facilitating access to cross-border balancing market<sup>140</sup> and transmission services (e.g., simplified capacity booking, transparent capacity fees).

Increasing share of intermittent energy sources, like RES or self-producers, will require more balancing capacity in electricity systems to prevent the risk of disconnection during peak hours, which may cause significant cost of energy – during peak hours, price of energy on Polish Power Exchange spot market may reach almost 70 €/MWh, which is higher than price on futures market. V4 countries should implement tools for facilitating energy purchases on balancing market, in particular, in joint platform for balancing purposes that will provide incentive to supply energy, where it is most needed (to the place with highest price).

This idea is supported by EU energy policy. Under Capacity Allocation and Congestion Management Network Code (CACM NC)<sup>141</sup>, European Commission assumes establishing single European market for intra-day (Cross-Border Intraday Initiative Project) and day-ahead electricity trading (European Price Coupling Project). Both projects should be conducted with engagement of TSOs, power exchanges, and market participants.

### Example

Price coupling on day-ahead market in North-West Europe (NWE) was implemented by the end of 2012. In 2014, a similar solution was launched between Czech, Slovakia, Hungary, and Romania (project Price Coupling of Regions, PCR). Currently, under PCR project, Poland has the status of observer (and was invited to participate in project). In the next phase, countries participating in PCR project will join NWE and create a single European energy market.

### Example

Nord Pool Spot is one of the largest commodity exchanges for electricity trading (spot market), measured in volume traded and in market share. This exchange operates in Norway, Denmark, Sweden, Finland, Estonia, Latvia, Lithuania, Germany, and the UK. Nord Pool Spot is owned by the Nordic and Baltic transmission system operators and regulated by the Norwegian Water Resources and Energy Directorate (NVE). Regional electricity exchange gives the ability to purchase electricity during peak hours, reduces costs of system operation due to efficient use of transmission cross-border capacity, and provides transparency. V4 countries may consider establishing a single platform for the purpose of balancing its regional electricity systems, based on the experience of Nord Pool Spot.

## 5.4.3 Joint trading licenses

Creating a single electricity market for V4 should be supported by introducing joint trading licenses within V4 Group. In 2014, V4 NRAs agreed to compare their licensing requirements and undertake an analysis. V4 countries should continue this exercise and develop one common trading license/license

<sup>139</sup> According to the data provided by Slovenské elektrárne, the national power utility in Slovakia, the total installed capacity in hydro power plants reached in 2015, circa 2400 MW. Slovenské elektrárne assumes that "The actually utilised potential of hydropower in the Slovak republic is about 57.5%." (<https://www.seas.sk/hydro-electric-power-plants>). The potential for hydro power plants in Czech Republic might be more modest – according to data provided by World Energy Council, technically exploitable capability of hydropower in Czech Republic is 3 978 GWh/yr (<https://www.worldenergy.org/data/resources/country/czech-republic/hydropower/>).

<sup>140</sup> Purchase energy in balancing market is different from regular electricity purchase. Balancing market is used to "last hour" purchase of energy required to balance the electricity system.

<sup>141</sup> Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management.

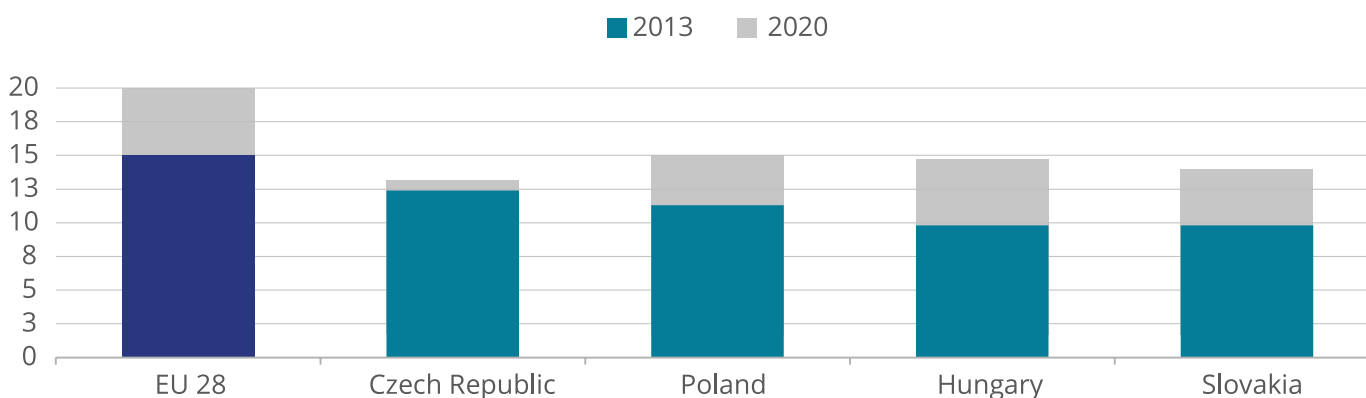
passporting that will give ability to traders registered in one country for trading operations in other V4 countries, without additional administrative burden (applying for administrative regulated prices). Common licensing criteria would facilitate entering new network users and give access to electricity market of a greater zone. Discussion of these issues should be continued under special groups of regulators, operating under ACER and with participation of market stakeholders.

#### 5.4.4 Decentralised generation and digitalisation as the future of electricity

Existing political and regulatory framework provides strong support for developing decentralised generation, mainly in a form of renewable energy sources (RES and increasing its share in final electricity consumption<sup>142</sup>). Under existing RES Directive, EU Countries agreed to set up obligatory national and EU targets of RES share in electricity consumption: in 2020, prospective EU target amounts to 20% and is endorsed to 27% up to 2030<sup>143</sup>.

To fulfil EU mandatory targets, each V4 Country brings efforts to promote higher use of renewable sources. From this point of view, RES market is another opportunity for enhancing regional cooperation between V4 Countries, in particular, in a form of cross-border infrastructure development, facilitated cross-border trading, or integration of electricity markets.

Figure 5: Share of renewables in gross final energy consumption, 2013 and 2020



Source: Eurostat (2013)

Deployment of RES may benefit not only with climate targets, but also give value to national economy by creating new jobs and increasing GDP (under recent IRENA study, doubling RES share may increase GDP of EU15 of 1% in a perspective of 2030<sup>144</sup>). It can be estimated that heavily subsidised coal mining (especially in Poland and Slovakia) in the near future may cause social costs greater than RES subsidies.

In many EU Countries, RES development is driven by public financial support available for companies operating on a national level in support schemes. Support schemes can address specific problems arising within given national system; however, when improperly used, they can hinder market integration and reduce cost-efficiency. In Poland, rapid amendments to RES support scheme<sup>145</sup> and proposed legislation on investments in wind generation may result in a potential investment gap in RES sector. Substantial changes are perceived by investors as increased risk of economic viability of RES investments (uncertainty about new RES support scheme forced investors to close RES projects before end of 2015 to participate in previous support scheme<sup>146</sup>). Substantial changes in RES support schemes have been observed in the other V4 Countries. In 2013, Czech Republic cut state subsidies to electricity produced from biomass, bio-methane, bio-liquids, solar panels, biogas, and the heat produced from biomass.

142 Renewable Energy Benefits: Measuring The Economics, IRENA (2016).

143 2030 RES target is binding on EU level only while 2020 RES target has been cascaded into national mandatory targets.

144 Renewable Energy Benefits: Measuring The Economics, IRENA (2016).

145 In 2015 Poland adopted new RES Act which has changed RES support system. Under new regulation green certificates scheme are replaced with RES auction scheme and feed-in-tariff (tariffs are limited to micro-generation). New system will be operational in mid-2016.

146 However, amendment to RES act adopted in last days of 2015 did not improve the situation – RES auctions will be able to start in the second half of 2016.



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Slovakia, in 2015, has lowered governmental support for PV by imposing “solar tax”<sup>147</sup> (however, those effects may be reduced by subsidy for biomass heating and small wind turbines for households in total amount of 115 M EUR).

Joint challenges in RES development may act as a starting point for further cooperation. V4 Countries may consider coordinating flow of their investments in RES, thereby decreasing the risk of low investments in RES sector. This approach may benefit not only in more economical fulfilment of EU targets (and decrease level of RES subsidies), but also in facilitating energy trading within V4 Group. Moreover, the regional RES scheme will be more predictable due to limited impact of national politics and, therefore, will be more attractive for long-term investments in new RES technologies. The idea of regional support scheme within V4 may be welcomed by EC, which under EU 2030 policy, the framework remarked on the need for rationalisation, different national support schemes, and closer alignment to internal market, increasing cost-effectiveness, and providing better legal certainty for investors.

### Example

Sweden and Norway, on 1st January 2012, launched a joint electricity certificate market (a form of support system). The joint market allows for trading in both Swedish and Norwegian certificates and receiving certificates for renewable electricity production in either country. Certificates for the production of renewable electricity in one country may be used to fulfil a quota obligation in the other.

For the period 2003-2011, RES production in Sweden increased by 240%, corresponding to 13% of total Swedish electricity production in 2011. Average cost of support scheme amounts to approx. 3-5% of total electricity price paid by final energy user.

Norway and Sweden both finance and benefit equally from the increase in new production in terms of the achievement of the countries' goals under the EU Renewables Directive. Compliance of this joint cross-border support scheme with RES Directive has been approved by ECJ in Ålands Vindkraft case (C-573/12).

Due to downfalls in electricity price, the revenues of energy companies were respectively decreased. Nowadays, energy companies are seeking solutions in new technologies to maintain their effectiveness and enable new investments, which can be achieved by implementing digital solutions. For new investment, digital solutions may give precise information, determining the optimal location of a new plant.

Digital solutions can reduce costs of operational management during electricity production and maximise return on investment: dedicated software will allow for better management of RES production and storage, adjust operating parameters to maximize output, reduce emissions depending on used fuel, and provide reliable information on electricity delivery<sup>148</sup>.

From the perspective of efficient operation of an electricity system, dedicated software may improve balance demand with the most affordable supplies. It can be combined with demand-side management tools (e.g., demand-side response, energy efficient buildings, lighting, and appliances) and, therefore, reduce assets needed for sustainable operation of electricity systems.

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147 European Energy Handbook, Herbert Smith Freehills (2015).

148 The Future of Electricity in Fast-Growing Economies Attracting Investment to Provide Affordable, Accessible and Sustainable Power, World Economic Forum (2016).



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## 5.5 Coordinated energy policies

V4 Counties have common goals in EU energy and climate policy. Coordination of V4s' energy policies is a milestone for making V4s voice more visible. In recent communication on State of Energy Union<sup>149</sup>, European Commission came to the point that Member States should coordinate and cooperate in developing their energy policies and conduct regional consultations on their energy and climate national plans as a part of the new system of governance in the Energy Union. Such regional cooperation may help to identify common goals under regional long-term regional energy and climate strategy and increase predictability of investments.

Between 2016 and 2018, Member States and European Commission will cooperate on developing national plans. Under our assumption, in the next months of 2016, V4 countries will be given a great opportunity to re-start regional discussion on energy issues and development of common approach in future energy strategies, in particular, on increasing security of natural gas supplies and electricity production in RES and creating an approach to new trends on the electricity market. Regional plans open up a wide range of possible cooperation between V4 countries and enforce their impact on EU energy and climate policy.

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<sup>149</sup> Annex Guidance to the Member States on the national energy and climate plans as part of the Energy Union governance to the to the Communication the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of Regions and the European Investment Bank – State of the Energy Union (2015).

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## 6. THE FUTURE OF INFRASTRUCTURE

Tomasz Nisztuk, Piotr Krzemiński, Damian Szewczyk

### 6.1 Executive Summary

The current intensity of cooperation between V4 countries in infrastructure leaves unutilized potentials. V4 countries should take joint actions to intensify international passenger transport and trade. Apart from the actions taken, the Visegrad Group should focus on improving cross-border connections, establishing appropriate financial incentives, increasing competitiveness of collective transport, and developing transnational intermodal terminals.

- 1. Improving cross-border connections.** V4 countries must focus on upgrading cross-border connections on TEN-T routes, creating a single pool of interoperable locomotives, and streamlining inefficient cross-border procedures. Upgrading cross-border connections on TEN-T routes requires coordinated investments in infrastructure. Creating a single pool of interoperable locomotives implies agreeing on the ownership structure of the rolling stock and clearing mechanisms. Joint purchases of such locomotives would enable reduction of delays caused by different traction voltages in V4 countries and avoiding parallel procurement. Streamlining procedures for rail freight services involves introducing trust based train handover procedures harmonized among all V4 countries and aligned with EU regulations, harmonizing operational and safety rules, and introducing mutual acceptance of train drivers.
- 2. Establishing appropriate financial incentives.** Visegrad countries can increase subsidies of international connections between them or introduce mutual acceptance of legally granted discounts for students, pensioners, and other groups with lower purchasing power. Subsidizing international connections is subject to negotiations at the political level and does not motivate operators to increase efficiency of their offerings. Establishing mutual reimbursement of discounts would include negotiations on precise mechanisms of reimbursement and decisions on which groups should benefit from it.
- 3. Increasing competitiveness of collective transport.** V4 countries can liberalize international rail connections between V4 countries and motivate operators to create more comprehensive travel offers. The liberalization, defined as choosing operator of each international connection in competitive tender, would enable choosing the most efficient operator in terms of cost efficiency, time of travel, and general quality (customer service, standard of rolling stock). Providers of cross-border collective transport services can create more comprehensive travel offers by extending sales channels and cross-selling. Governments of Visegrad should establish a forum for operators to share their experiences on how to expand operators' cross-border offers.
- 4. Developing transnational intermodal terminals.** Intermodal terminals should be located in border areas near clusters of automotive, electronics, and household appliances manufacturers. Low-volume customers can also benefit from intermodal terminals by forming consortia. These terminals should offer block train services. Cross-border intermodal terminals offering block train services can enhance export from V4 countries to Western EU and, in long-term perspective, to Asia. This becomes especially important, given the background of China's efforts to develop connections to Europe through the New Silk Road and One Belt, One Road Initiatives. The Visegrad Group would benefit much more from cooperating on these initiatives than competing against each other.

## COMMENT

*In the time of rising traffic demand, increasing road congestion and major climate changes, integrated transportation system development is considered to be a major challenge. Tackling this issues requires clear vision on how to balance and diversify future transportation capacity demand between different transport branches and implement infrastructural improvements.*

*Beyond any contestation transport is fundamental for the economy and the society. Internal and cross-border mobility is vital not only for the market to prosper, but equally for tourists to travel. Efficient transport systems stimulates economic growth and job creation. It is expected, that future prosperity of Europe will depend heavily on the ability to provide the opportunities for cost efficient transport within integrated, coherent transportation system.*

*In order to realize the vision of integrated European transportation system the countries of Visegrad require significant amounts of effort to improve the current state of infrastructure. The emphasis shall be put on removing physical and technical barriers, operational and administrative requirements optimization and providing sources of financing.*

*The new EU financial perspective provides V4 countries the opportunity to gain substantial resources to be invested in the infrastructure, with special emphasis put on the transportation. In order to provide the infrastructure with opportunities for sustainable development, ambitious construction programmes, financed substantially by EU must be supported with long-term maintenance financing programme.*

*Wojciech Zając, former advisor to the Minister of Infrastructure and Development of the Republic of Poland*

## 6.2 Current state of the V4 infrastructure

This fourth and last section of our report presents our vision and possibilities for regional cooperation in terms of infrastructure development. There are common goals which create opportunities for joint development of infrastructure strategy within V4 Group.

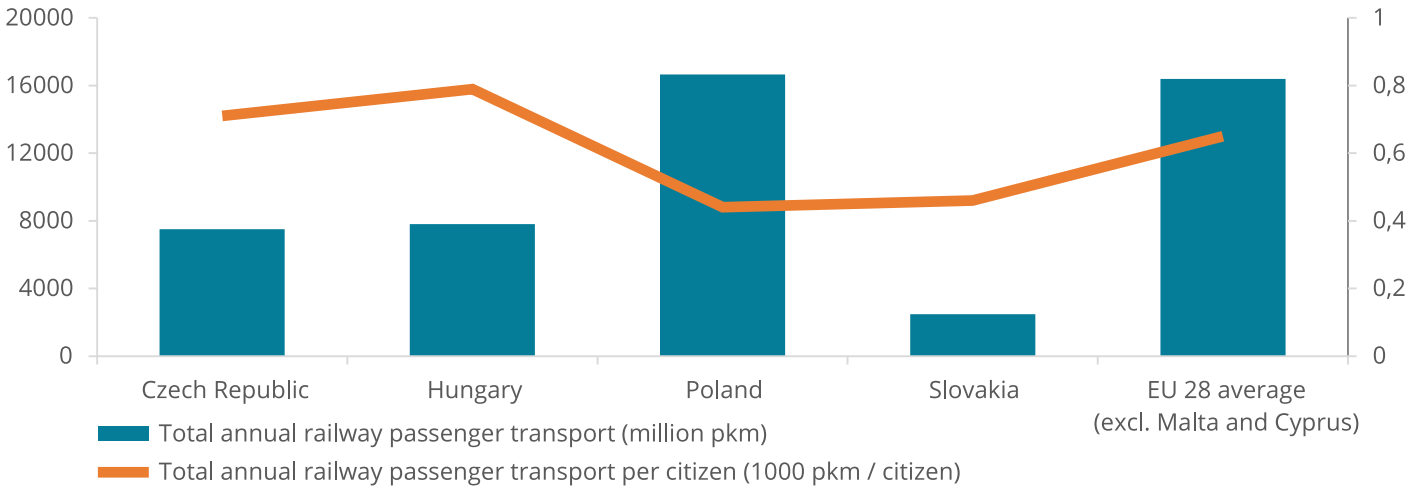
For this report, we have focused on transport infrastructure, defined as railways and roads infrastructure. We have tried to touch upon the not-so-obvious areas of cooperation, i.e. issues that have not been (fully) addressed yet. In these paragraphs, we present diagnoses of the main infrastructure challenges and highlight potential synergies for V4 countries. As in the previous chapters, our diagnosis is followed by relevant recommendations.

It is important to note, that we present the ideas which we believe are possible to implement; however, an in-depth analysis should follow to assess the feasibility of each individual proposal.

### 6.2.1 Domestic passenger transport and freight transport in V4 is intensive

Passengers in Czech Republic and Hungary travel more by train, compared to the EU average, whereas Polish and Slovak passengers travel less than the statistical EU citizen.

Figure 1: Passenger railway transport (EUROSTAT for 2013 or earlier depending on data availability)

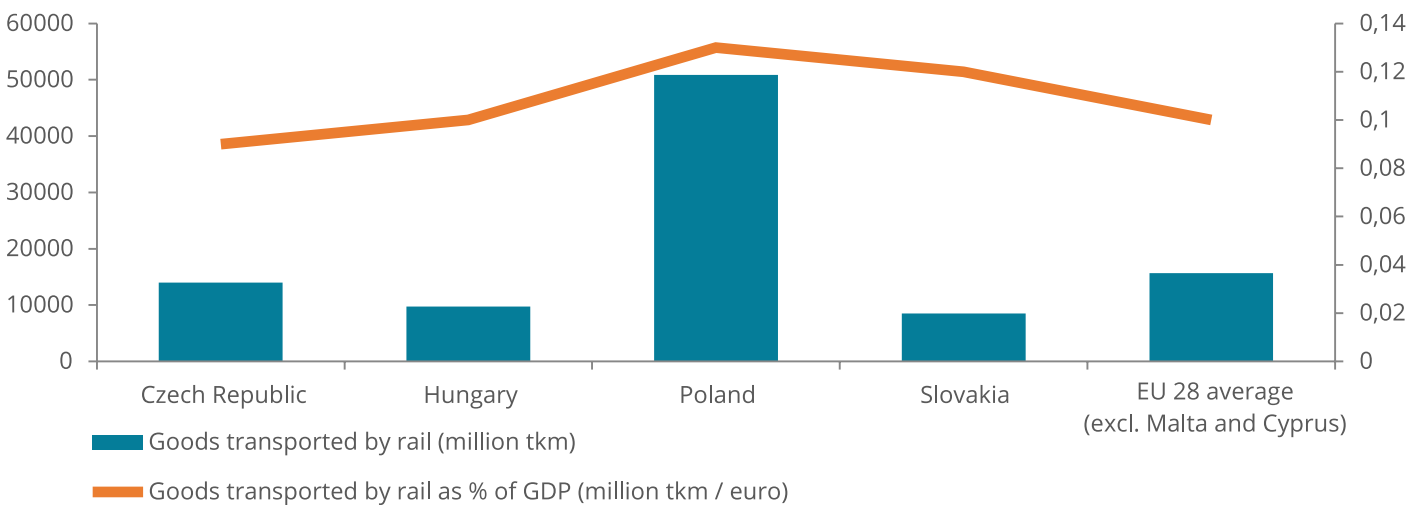


Polish passenger railway transport is the biggest among V4 members in terms of passenger kilometres (pkm) – Poland noted almost 17 bln pkm in 2013, i.e. almost 50% of traffic in V4. What is specific about that variable in V4 is that the other Group members are substantially below the EU28 average of 16.4 bln pkm. The opposite could be observed for passenger railway transport per citizen. The average citizen travels the most by rail in Hungary and the least in Poland. Both Hungarian and Czech Republic average passengers travel by rail more than the EU28 average passenger.

### 6.2.2 Economies of V4 countries depend highly on rail freight

When compared to the EU28 and V4, Polish freight transport depends highly on rail. Interestingly, the payload distance in Poland accounted for approximately 50 billion tonne-kilometres (tkm) - three times higher than both the EU28 and V4 average. Polish payload distance accounts for 61% of the V4 total. Poland is also the leader in terms of payload distance share compared to GDP, meaning that the Polish economy is substantially driven by railway transport sector, especially compared to other V4 countries and EU28. Similar relationship may be observed in Slovakia, which is slightly below Polish level. Both Czech Republic and Hungarian share of payload distance in GDP are close to EU28 average level.

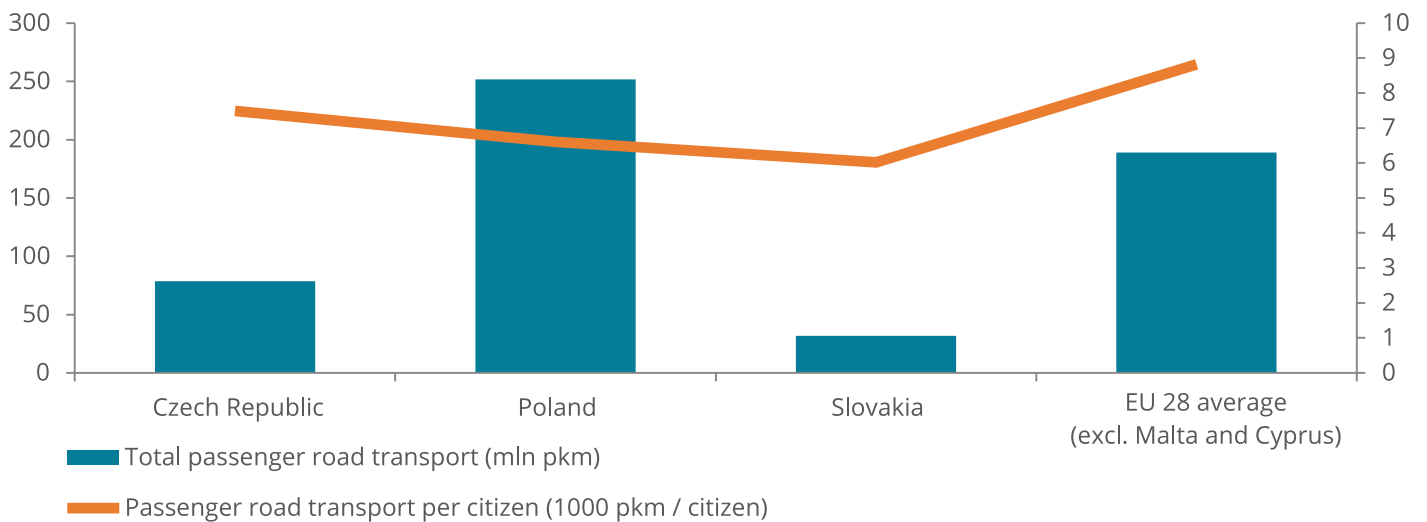
Figure 2: Freight railway transport (EUROSTAT 2013 or earlier depending on data availability)



## 6.2.3 Road passenger transport plays even more important role compared to rail passenger transport

Passenger road transport distance is high in Poland, (data for Hungary was unavailable). Poland notes approximately 250 billion pkm annually in road transport (which is more than 16 billion pkm in railway transport), while Slovakia only 5 billion pkm. The average Czech citizen travels annually the most by roads in V4, i.e., approx. 7000 km, while the Slovakian citizen the least - approx. 6000 km. These numbers are still below the EU28 average, which amounts to almost 9000 km per citizen. It has to be emphasized that it is only a statistical value, including all means of transport, i.e., motorcycles, cars, and buses.

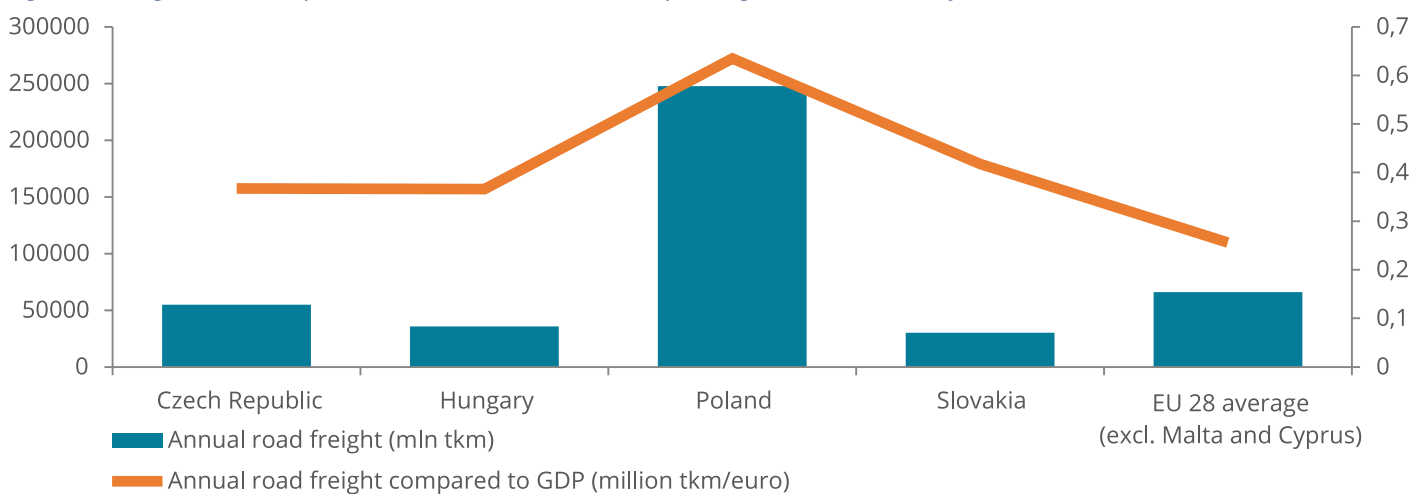
Figure 3: Passenger road transport (EUROSTAT 2013 or earlier depending on data availability)



## 6.2.4 Economies of V4 countries depend highly on road freight transport

Freight road transport is dominated by Poland, both in terms of payload distance and road transport share, compared to GDP. Annual road freight transport in Poland accounts for almost 70% of total annual road freight transport in V4. Even more interesting, all V4 countries are above EU28 average in road freight transport share in GDP. This means, all V4 economies are more dependent on road freight transport than the average EU economy.

Figure 4: Freight road transport (EUROSTAT 2013 or earlier depending on data availability)

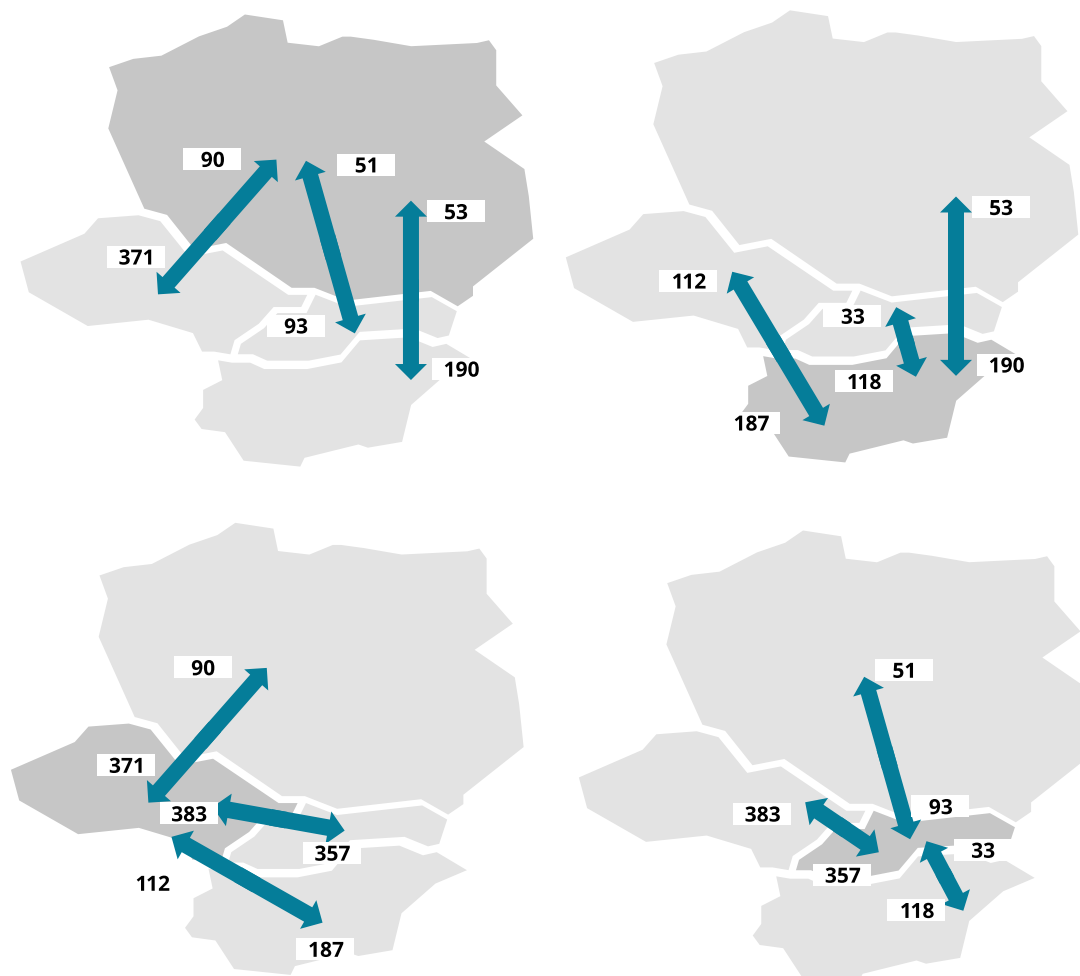


However, as we may see, **the international transport and freight among V4 countries is less intensive, compared to international flows of goods and passengers from V4 countries to outside partners.**

## 6.2.5 Cross border passenger transport between V4 countries is less intensive than with outside countries

The charts below present the passenger flows between V4 countries in 2012. The analysis of the numbers indicates that passenger flows between Czech Republic, Slovakia, and Hungary were more intensive and balanced, i.e., numbers of passengers leaving a country and visiting the country were comparable. Poland was the least popular destination among all V4 countries. It had the lowest number of total visits of passengers from other V4 states. The country has been the least popular destination for passengers from Czech Republic and Slovakia. Also, there was large imbalance between the number of Polish passengers visiting other V4 countries and the number of incoming passengers.

Figure 5: Tourism in the V4 countries in 2012 (1000 people)



Source: G. Gaal, M. Csete, A. Torok, *Regional Development of the V4 Countries*.

Comparing passenger flows between the V4 and other countries, one can conclude that passenger flows here are more intensive. Passenger flows between V4 countries and Germany can serve as an example. In 2012, Poles generated 2 million overnight stays in Germany, Czechs 900 thousand, Slovaks 300 thousand, and Hungarians 714 thousand.<sup>150</sup>

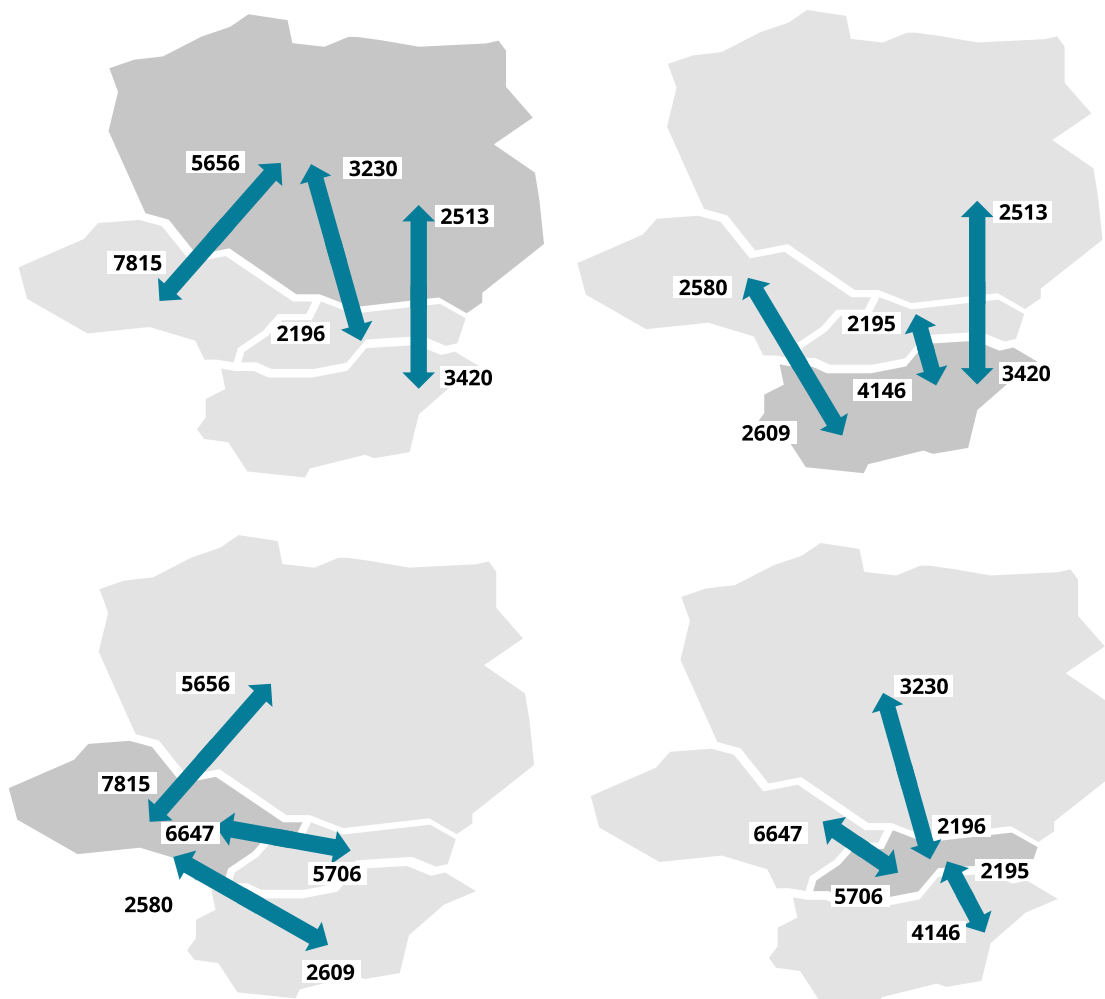
## 6.2.6 Cross-border trade between V4 countries is also less intensive compared to trade with outside partners

In 2012, the export and import trade with Germany was EUR 66bn, with the Czech Republic, EUR 69bn in Poland, EUR 38bn in Hungary, and EUR 20bn in Slovakia. Poland has the most intensive relation with Russia (EUR 29bn), but the other countries are also significant. The Czech Republic, Poland, and Hungary have similar traffic with China, and this is just higher than the traffic within the V4 countries.



Hungarian trade with other V4 countries amounted to EUR 18bn in 2012, which was almost half of the value traded with Germany. Value of trade between Poland and V4 countries was equivalent to 36% of trade with Germany. Czech Republic's exchanged of goods with the Visegrad Group was worth 47% of its trade with Germany. Only with Slovakia, the trade with V4 countries was more intensive than with Germany and has reached 121% of this country's trade with Germany.

Figure 6: Foreign trade between V4 countries in 2012 (EUR million)



Source: G. Gaal, M. Csete, A. Torok, *Regional Development of the V4 Countries*.

## 6.3 Major factors behind the current state

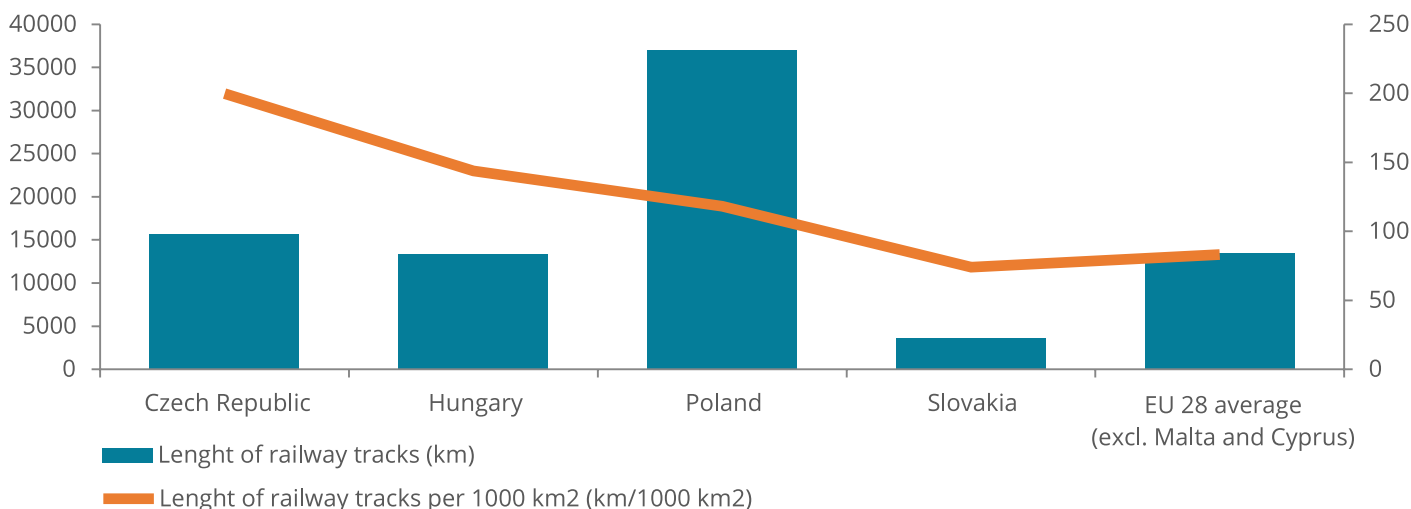
The low level of cross-border passenger transport and trade between V4 countries lies in the **poor state of the local infrastructure**.

### 6.3.1 Rail infrastructure of V4 countries is relatively better developed compared to other EU countries in terms of length of railway tracks

The length of railway tracks in V4 is dominated by Poland with almost 37 000 km of lines, representing 53% of all V4 railway tracks. It has to be emphasised that the total length of tracks does not present the full picture, since V4 countries' area varies significantly. In terms of railway tracks density, the Czech Republic is the leader, with almost 200 km of tracks per 1000 km<sup>2</sup>.

The Visegrad Group resembles the railway track density of EU28, however, with Poland exceeding EU28 average nearly three times, and Slovakia having nearly three times less kilometres of railway tracks per 1000 km<sup>2</sup> than EU28.

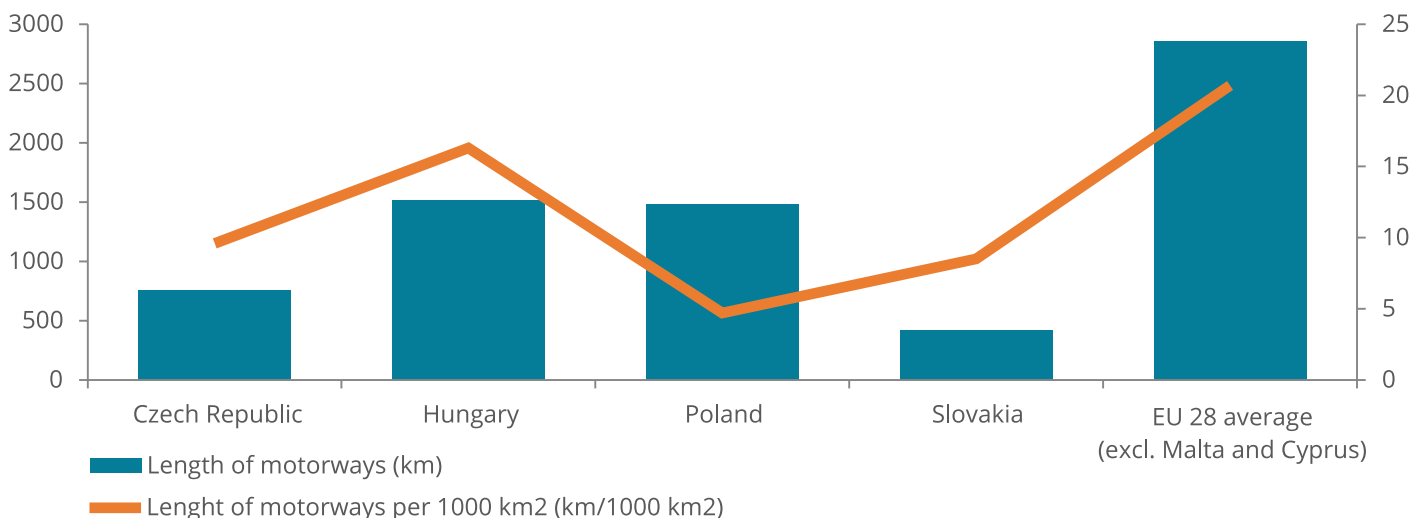
Figure 7: Length of railway tracks (EUROSTAT 2013 or earlier depending on data availability)



### 6.3.2 Road infrastructure is less developed in V4 countries compared to the EU average

There are much more similarities in V4 in terms of road transport than in railway transport. The total length of motorways is the highest in Hungary (1515 km) and the lowest in Slovakia (419 km). The EU28 average of motorways' length is much higher than in every V4 country. The same can be observed for another variable – motorways' density. In that case Hungary is the leader again, while Poland is at the very end of V4.

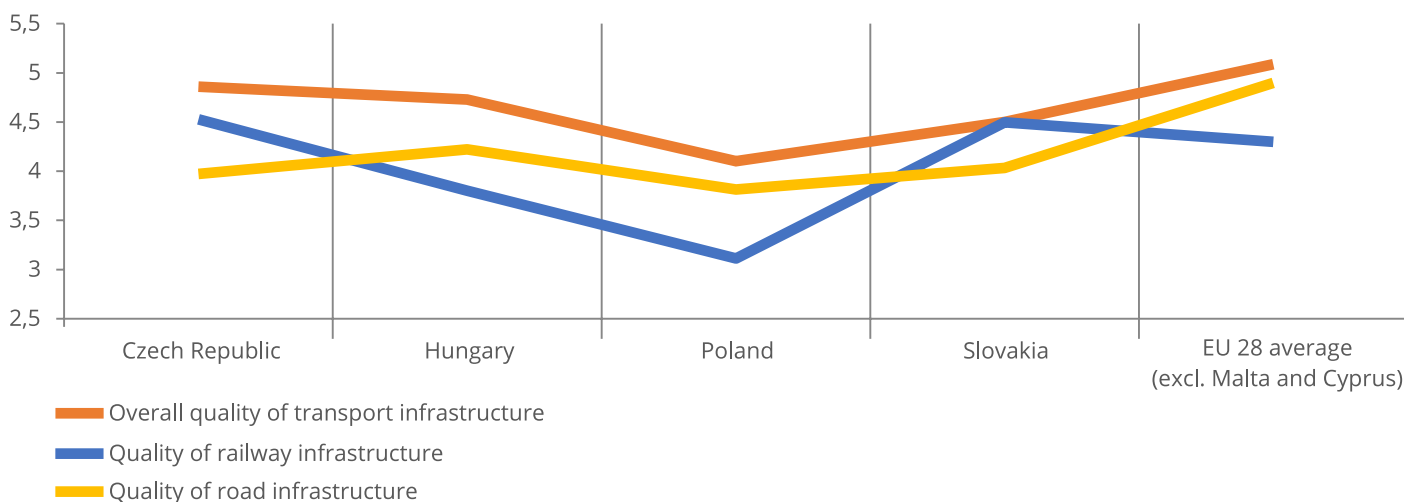
Figure 8: Length of motorways (EUROSTAT 2013 or earlier depending on data availability)



### 6.3.3 Overall quality of transport infrastructure in V4 countries is poor

The quality of infrastructure has been measured by The World Economic Forum as a part of Global Competitiveness Index. The results, as of 2014-2015, in general for transport infrastructure and separately for roads and railways are presented below for V4 and EU28. The first conclusion is that Poland's infrastructure has the lowest quality when compared to both V4 and EU28. The second conclusion is, overall, V4 infrastructure quality is still below EU28 level. Only two V4 members, Slovakia and Czech Republic, are close to EU28 thresholds in terms of railroad infrastructure.

Figure 9: Quality of infrastructure (1-7 (best); The World Economic Forum 2014-2015 or earlier depending on data availability)



### 6.3.4 Overall quality of cross-border infrastructure is also poor

Regarding the road network, it can be stated that the East-West connections are more developed than the North-South.<sup>151</sup> Interesting numbers can be found in the field of border crossings. Traffic must travel more to the nearest border crossing at the internal V4 borders (Table 1) than in the case of the external V4 borders (Table 2)

Table 1: Border crossings between V4 countries (2012)

Border	Length [km]	Number of land border crossings	Average distance between border crossings [km]
Czech Republic – Slovakia	252	22	11,45
Poland – Czech Republic	762	36	21,17
Slovakia – Hungary	515	26	19,81
Poland - Slovakia	444	19	23,37

Source: G. Gaal, M.Csete, A. Torok, *Regional Development of the Transportation Systems of the V4 Countries*

Table 2: Border crossings at the external borders of the V4 countries

Border	Length [km]	Number of land crossings	Average length between border crossings [km]
Hungarian – Austrian	366	22	16,64
Slovakian – Austrian	91	8	11,38
Czech – Austrian	362	26	13,92
Czech – German	646	46	14,04
Polish – German	456	36	12,67
Polish – Ukrainian	526	12	43,83
Hungarian - Romanian	443	15	29,53

Source: G. Gaal, M.Csete, A. Torok, *Regional Development of the Transportation Systems of the V4 Countries*

151 G. Gaal, M.Csete, A. Torok, *Regional Development of the Transportation Systems of the V4 Countries*.

## 6.4 Solution enhancing integration of V4 countries can be the TEN-T corridors

### 6.4.1 There will be 2 TEN-T corridors in the V4 area

Trans-European Transport Networks (TEN-T) are a plan set of transport networks (road, rail, air, and water) in the EU. The main goal of this project is to provide integrated and intermodal long-distance, high-speed routes across the EU. The V4 members are also a part of it within the two corridors Baltic – Adriatic (Poland, Czech Republic, Slovakia) and Rhein-Danube (Czech Republic, Slovakia, Hungary).

The Baltic-Adriatic corridor is 2400 km long and will connect the Baltic ports in Poland with the ports of the Adriatic Sea, through industrialized areas between Southern Poland (Upper Silesia), Vienna and Bratislava, the Eastern Alpine region, and Northern Italy. It starts at the harbours of Gdansk and Gdynia, connecting via strong economic centres, like Warsaw, Vienna, and Venice, to Trieste and Ravenna. The corridor has branches from Szczecin to Katowice, from Graz via Udine to Trieste, and via Ljubljana to Trieste/Koper. The corridor will provide better access to Baltic and Adriatic seaports for the economic centres in Poland, the Czech Republic, Slovakia, and Austria. Detailed map of the Corridor is presented below.

Figure 3. TEN-T Baltic Adriatic corridor



Source: [www.ec.europa.eu](http://www.ec.europa.eu)



The Rhein-Danube corridor will provide the main east-west link between continental European countries, connecting France, Germany, Austria, Czech Republic, Slovakia, Hungary, Romania, and Bulgaria all along the Main and Danube rivers to the Black Sea by improving (high speed) rail and inland waterway interconnections. The details of this corridor are presented below.

Figure 4. TEN-T Rhein-Danube corridor



Source: [www.ec.europa.eu](http://www.ec.europa.eu)

## 6.4.2 V4 countries can cooperate on the improvement of cross-border connections

To succeed with development of the TEN-T corridors, cooperation between the V4 countries is required. For both corridors, the main issues lie in upgrading the cross-border connections and inefficient cross border procedures.

On the V4 part of the Baltic-Adriatic corridor, the multimodal cross-border connections between Vienna, Bratislava, Ostrava, and Katowice must be upgraded. For the Rhein-Danube corridor, the major issues and missing links remain: cross-border rail interconnections between Germany, France, Austria, and Czech Republic, development of rail (probably high-speed), and development of inland waterways transport.

All V4 countries have planned investments in the cross-border sections, which aim at upgrading technical parameters of the infrastructure, such as maximum speed, length of the train, maximum pressure on tracks, etc.

Actions have also been taken to coordinate activities of all Visegrad governments. On June 24th, 2014, the Prime ministers of V4 countries signed the Memorandum of Understanding in Budapest, concerning the Roadmap for Determining the Future Development of the Transport Networks of the Visegrad Group Countries. This document constitutes a foundation for cooperation and joint coordination of V4 countries' activities in infrastructure investments. Another institution that helps to coordinate these activities is the Presidency of the V4 Group. The role of the presiding country is to present high-level program of the tenure. As part of the program, the presiding country arranges expert meetings to exchange experiences, mobilizes governments to work out joint position on infrastructure topics discussed at the EU level, and coordinates actions to obtain financing from CEF. These actions must be assessed positively; however, we see more areas for cooperation.

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One of the key issues in context of cross-border connections is different voltage of railway traction in different countries. Traction in Poland has 3 kV. Czech Republic and Slovakia are split into parts with 3 kV and 25 kV. Hungary is entirely covered with 25 kV voltage traction.<sup>152</sup> As of now, different voltage of traction forces rail operators to use different locomotives for different countries. This lengthens travel time and increases costs – the operators often must borrow locomotives from the national operator of the specific country and are charged commercial rates for this service. An alternative would be a multi-traction locomotive, or a so-called interoperable locomotive, which can use tractions with different voltages. However, these locomotives are considerably more expensive - they cost 10-15% more than traditional ones. Technical maintenance and repairs are also much costlier. Therefore, operators would only invest in these locomotives if the time savings over locomotive change at the border can justify it. From the point of view of the train operator, it is not relevant which company provides the traction service with the multisystem locomotive, as long as a competitive price is offered. Therefore, the national railway companies of V4 countries could create **a pool of multi-system locomotives that could be deployed, based on the demand, instead of creating competition for traction services by parallel procurement of the locomotives**. Joint purchase of such locomotives, thanks to larger scale of order, would enable negotiation of lower prices for locomotives and more favourable maintenance conditions.

Delays on borders between V4 countries also results from cross-border procedures for passenger and freight trains. The time needed for cross-border procedures is linked to several factors, including:

- Level of interoperability: If traction is different across the border (electric/diesel), a change of locomotive is required. Similarly, if the electrification and signalling/safety systems are different on either side of the border and no multisystem locomotives are available, locomotives must be changed.
- Technical wagon inspection (e.g. breaks) are carried out to ensure the condition of the wagons entering a country conform to national regulations.
- Documents concerning the train and the cargo are exchanged. If not done electronically, it will add to the time needed for border procedures.
- Even when multi-system locomotives are available, the lack of mutual acceptance of drivers may prevent the same locomotive from travelling across the border, hence, border-crossing is delayed.

Transit times for rail freight services can be reduced considerably by **introducing trust based train handover procedures, harmonized among all V4 countries and aligned with EU regulations**. These should be based on mutual agreements between train operators from Poland, Czech Republic, Slovakia, and Hungary, in which the technical handover procedure is only carried out by one operator, while the other operator (or operators) ‘trusts’ the technical checks already carried out. Such agreements would comprise references to the mutual acceptance of rolling stock. Railway companies would have to accept any technical inspections or checks on rolling stock carried out by railway undertakings with agreements of mutual confidence to speed up the border dispatching procedures. A rail operator may also carry out the technical inspection of rolling stock in one of its hinterland terminals.

Cross-border procedures could be further simplified by **harmonising operational and safety rules**. This way, procedures to change, e.g. tail signal lamp, breaking sheet, and wagon list could be avoided. The transport of hazardous goods could also be speeded up by **carrying out the detailed inspection only at the origin and the destination** of the train. The establishment of **cross-border operation centres** can further enhance cross-border procedures by taking responsibility for cross-border traffic management, quality management, and real-time information to customers.

**Mutual acceptance of train drivers** could speed up cross-border procedures, as the same train personnel can drive the train for the entire length of the route. The mutual acceptance will be facilitated through the harmonised train driving licences introduced in the EU by Commission Regulation (EU) No 36/2010. As not all train drivers will automatically receive the licence accepted all over the EU, train



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operators must invest in the training of their train drivers, so more of them could get this new licence. To enhance the process of obtaining new licences by train drivers, **rail operators of V4 countries could launch joint training programs** to share experiences and teaching resources.

### 6.4.3 V4 countries can work on establishing appropriate financing and increasing competitiveness of collective transport to enhance cross-border transport between them

Until 1989, cross-border passenger services between V4 countries for road transport were monopolized by state-owned operators and subsidized. With the move towards market economy, road transport markets have been liberalized, which resulted in a large influx of private operators and cancelling of state subsidies. Nowadays, the market of cross-border transport passenger services between V4 countries is dominated by private organizations, and the service is fully commercial; no discounts for social groups with lower purchasing power (students, pensioners, etc.) are legally granted.

Passenger services for rail transport are partially subsidized. Long distance intercity connections, with exception of a few routes, are realized by national monopolies, such as PKP Intercity in Poland, ČD in Czech Republic, ZSSK in Slovakia, and MÁV-START Zrt in Hungary. Regional cross-border connections are realized by regional carriers. Discounts for social groups with lower purchasing power are legally granted only within the country where the person lives or is studying. Apart from legal passenger discounts, most of the cross-border connections are subsidized, as attendance is too low to offer them as a commercial service. These subsidies concern only domestic sections of the international connections.

Comparing road to rail passenger transport services, road transport operators, despite no subsidy, offer highly competitive rates and more convenient time slots and routes. To **convince more passengers to travel between V4 countries**, governments can commit to three actions: subsidizing cross-border collective transport, increasing efficiency of cross-border rail transport, and creating more comprehensive travel offers.

Subsidies for cross-border collective transport can take the form of **simple increase of subsidies** to international rail connections or introduction of subsidies to road connections. Such solutions, however, are subject to negotiations at the political level and do not motivate operators to increase efficiency of their offerings. Therefore, its' usefulness would require in-depth analysis of benefits and costs.

V4 countries can also introduce **mutual acceptance of legally granted discounts for students, pensioners, and other groups with lower purchasing power**. Thanks to this solution, the mentioned groups would benefit from their discounts on the entire route, not only on the domestic part of the route. On the financing side, **governments would have to repay each other's liabilities**. So, e.g. a Czech pensioner, travelling from Prague to Warsaw by train would pay for the ticket price minus his respective discount, which would create liability of Czech government to the Polish government equivalent to the lost revenue (i.e., amount of money the Czech pensioner is not paying while travelling on the Polish part of the route, because he has his discount). Reverse scenario would work if a Polish pensioner would like to travel by train from Warsaw to Prague.

This example only presents general idea of mutual acceptance of discounts. Precise mechanism of reimbursement and decision on which groups should benefit from it would be subject to detailed analysis and negotiation to reach a compromise, acceptable to all parties involved. At this stage, **we recommend excluding from the process the staff of railway companies, who enjoy excessive discounts**. Granting them identical discounts outside of their home country would enable them to travel to V4 countries nearly for free and would create excessive liabilities for the governments. It is also worth mentioning that mutual acceptance of discounts **can be attractive in the context of ageing populations** of V4 countries, which will cause growing number of pensioners who could benefit from this solution.

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Increased efficiency of cross-border rail transport can result from liberalization of international connections between V4 countries. Liberalization, defined as choosing operator of each international connection in competitive tender, would enable choosing the most efficient operator in terms of cost efficiency, time of travel, and general quality (customer service, standard of rolling stock). Origin of the company, in this model, should play no role. Even in the competitive tender, state monopolies have the highest chance to continue realizing the service due to their current expertise and government support. Still, the sole fact that state monopolies would be challenged by competition would cause efforts to improve quality of their services.

Liberalization of rail passenger transport and freight in V4 countries has been enforced by the EU since early 2000s; however, by April 2016, state-owned monopolies were still dominating. In the passenger segment, Arriva-PCC was the first new rail market entrant into the passenger transport market in the V4. It has been transporting around three million people per annum in northern Poland, since 2007. The short term goal of Arriva-PCC was to expand further in Poland and enter the Czech Republic. However, by April 2016, this goal has not been accomplished.<sup>153</sup> A similar case has been observed in Slovakia, where in January 2011, ZSSK lost its monopoly on subsidised passenger transport, as RegioJet was awarded a contract to operate Bratislava - Dunajská Streda -Komárno services. However, the general notion for passenger rail transport in V4 countries is that none of the private passenger rail operators gained significant market share. International passenger rail connections in Poland were supposed to be open since 2015/2016 rail schedule<sup>154</sup>; however, by 2016, no significant competition for state monopolies was present.

Liberalization of freight markets has been more intensive. The freight companies (PKP Cargo, ŽSSK Cargo, ČD Cargo, Rail Cargo Hungaria) have functioned independently from the former incumbent companies since 2001-2007.<sup>155</sup> Gradually, new, privately owned organizations, entered the market and have been active on international routes. Nevertheless, in freight markets, state monopolies sustained dominant market share.

Creating more comprehensive travel offers means providers of cross-border collective transport services must work on creating new sales channels and cross-selling. These offers could be combined with offers of touristic destinations (e.g. promotions offering tickets combining a rail ticket and entrance fee or local public transport). **Governments of V4 countries should establish a forum for operators to share their experiences.**

#### 6.4.4 V4 countries can also cooperate on using combined transport and block trains to enhance export to non-V4 countries

Combined Transport is a system of transporting goods in one transportation unit (large container, swap body, a rollable container) or on a road vehicle, which also makes use of rail or water transport. It involves the transportation of a load in one transportation unit, using several types of transportation, and only the combined-transport transportation unit is re-loaded, not the goods, themselves. The term, inter-modal transport, means freight transport during which the truck, trailer, semi-trailer, removable swap body, or a container uses roads for the initial and/or final leg of the trip, and in the remaining sector, is transported, with the towing vehicle, or without it, by rail, via a water route, or by sea.<sup>156</sup>

A unit train, also called a block train or a trainload service, is a train in which all cars (wagons) carry the same or diversified commodity and are shipped from the same origin to the same destination, without being split up or stored en route. This saves time and money, the hassle, delays, and confusion associated with assembling and disassembling trains at rail yards near the origin and destination. It also enables railways to compete more effectively with road and internal waterway transport systems. However, unit trains are economical only for high-volume customers. Since unit trains often carry only one commodity, cars are all of the same type, and sometimes, the cars are all identical, apart from

153 A. Kelemen-Erdős, Measuring Railway Market Attractiveness: Evidence from the Visegrad Countries

154 <http://kurierkolejowy.eu/aktualnosci/10008/kto-zdobedzie-polaczenia-miedzynarodowe.html>

155 A. Kelemen-Erdős, Measuring Railway Market Attractiveness: Evidence from the Visegrad Countries

156 <http://www.mdcr.cz/en/Railway+Transport/Combined+Transport/default.htm>

possible variations in livery.<sup>157</sup> In terms of payment, the customer pays for the entire capacity of the train; therefore, risk of low utilization of the train is on his side. Therefore, for uniform goods, it is essential to generate regular high-volume shipments, whereas manufacturers of different goods, willing to use the block train service, can form consortia to cumulate their volume.

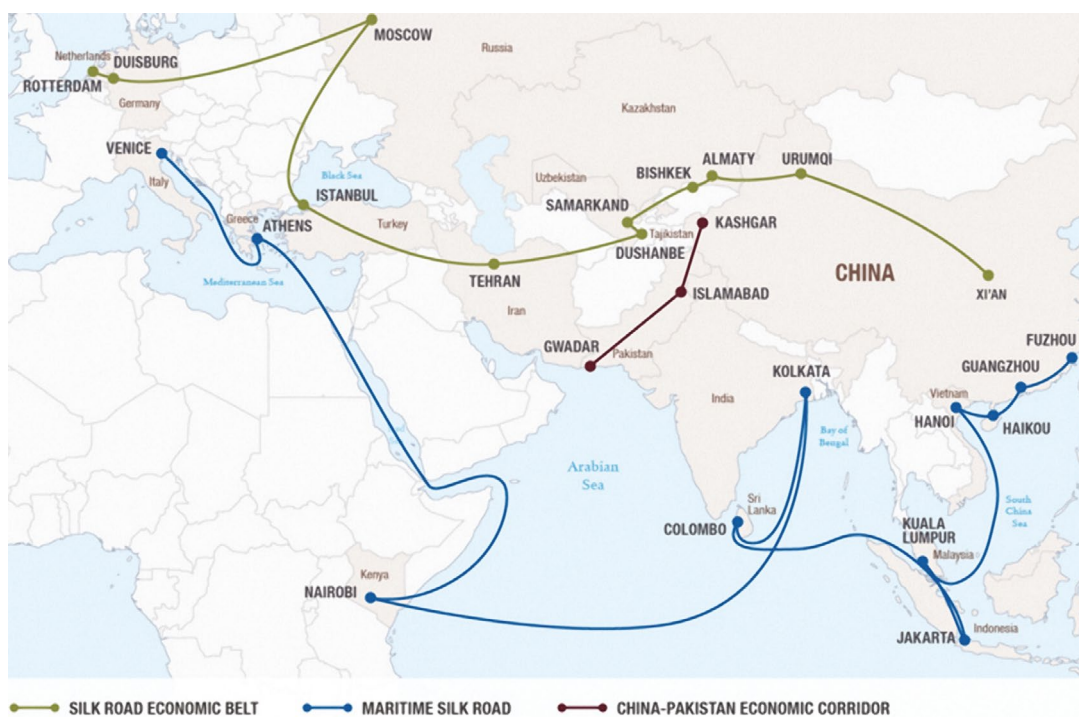
V4 countries can benefit from the two described business solutions by building multimodal transport terminals near to trans-border economic centers. As trans-border economic centers, we understand regions comprising territories of at least two V4 countries are characterized by intensive economic activity on both sides of the border. As a trans-border economic center could serve, e.g. automotive clusters in Polish Silesia region, the Czech Republic, and Slovakia, V4 countries, in this case Poland, Slovakia, and Czech Republic, could commit to building a multimodal transport terminal, which would serve the local automotive factories. Cars would get from factories to the terminal, where the shipments would be consolidated and sent to the customers. Thanks to joint orders, car manufacturers could use the block train service and benefit from lower rates.

Other industries that might benefit from this idea might be factories producing electronics and household appliances in Poland, the Czech Republic, Slovakia, and Hungary and mining industries in Poland and the Czech Republic. Potentially, even single factories from niche industries could benefit from this solution. Rail operators could create flexible offers, where they would take risk of train utilization on their shoulders. Or, if the operators would only offer the block train service, small factories could form consortia with other large volume clients. Multimodal transport and block trains could enhance export from V4 countries to Western EU and, in long-term perspective, to Asia. Western EU countries are the main export partners of V4 members, whereas international trade with Asia has been receiving growing publicity due to Silk Road Economic Belt.

In 2013, Chinese President Xi Jinping proposed an initiative of jointly building the Silk Road Economic Belt, which attracted attention from all over the world. This project is aimed at boosting the trade between Asia, Europe, and Africa based on policy coordination, facilities connectivity, unimpeded trade, and financial integration. The V4 countries may benefit from its existence, since they are on the route of the Belt. Since the project has no official framework and path, it is important to observe the situation and join any initiative or mechanism leading to Silk Road development. V4 and its leaders may play an important role by, i.e. promoting the idea at the EU level or creating financial and operational mechanisms in V4 countries to cooperate with Asian partners. The unofficial Silk Road Economic Belt map is presented below.

Figure 5.  
Proposed routes  
of the Silk Road  
Economic Belt

Source: Xinhua



157 [https://en.wikipedia.org/wiki/Unit\\_train](https://en.wikipedia.org/wiki/Unit_train)

## 7. AUTHORS



**Damian Polok**  
Project Leader  
Team Leader Finance

Born in Poland, raised in Germany, Damian understood early on in his life about the benefits of cross-cultural cooperation. His career path led him through some of the world's financial centres, including London, Frankfurt, Moscow, Shanghai and Singapore. For his studies in CEMS International Management and International Business he has chosen Cambridge, Berlin, Warsaw and Hong Kong.

As alumni of the Academy of the Leaders of the Capital Market, the American Institute of Political and Economic Systems in Prague and Visegrad School of Political Science, he is largely engaged in Central Europe's integration. He organised the Central and Eastern Europe Capital Markets Leaders Forum in Warsaw and contributes to the public debate on the region's development in finance, education and entrepreneurship through publications and comments in media. In his free time Damian is a passionate football and rugby player and a dedicated passport stamp collector.



**Pawel Michalski**  
Project Leader  
Team Leader Entrepreneurship

Pawel has two years of experience in project and structured finance with the biggest bank in the CEE. He is also involved in matters relating to infrastructure and energy investments. Prior to his role at the bank he gathered experience in at legal firms, providing capital market related services.

He graduated from the Faculty of Law at the University of Warsaw (with distinction) and pursues his second degree at the Warsaw School of Economics. He also studied at the University of Zurich and completed the German Law School organised by the University of Bonn.

In his spare time Pawel develops non-governmental and charity projects. He leads the Infrastructure Team at the Young Reforming Poland and is a member of the board at Weimar Triangle Association. Pawel also helps developing several projects of the Lesław Paga Foundation, including the Capital Market Leaders Academy. He also enjoys reading books and playing basketball.



**Damian Szewczyk**  
Team Leader Energy and Infrastructure

Damian has 5 year experience both in private and public sectors. He is currently engaged in FinTech and Venture Capital sectors developing an international private bank. Previously he has been working an investment professional in Polish State Railways Group (transport and real estates), Credit Suisse and Bastion Group (investment banking).

Besides business he is engaged in a number of pro bono initiatives concentrated on capital markets education in Leslaw Paga Foundation through participation in Capital Market Leaders Academy and CEE Capital Market Leaders Forum as an originator and project manager. He is also a member of the Board in "The Young Reforming Poland" association dealing with public policy issues as an expert for energy, infrastructure and capital markets.

He graduated from Cracow University of Economics and holds a MSc in Corporate Finance Management and Controlling. He studied also in Wirtschaftsuniversität Wien. In free time he runs and travels.





## Dominik Keil

### Finance

Dominik is a passionate of analysing varying businesses from financial and strategic perspective. He started his career while pursuing two bachelor faculties at Poznan University of Economics, namely: Strategic Management and Finance & Accounting. During his studies he completed a one year internship in the Valuation and M&A department of Polish branch of international advisory firm Grant Thornton. After exploiting opportunities in Poznan he decided to move to Warsaw, where he completed summer internship at Innova Capital – one of the leading Private Equity firms in the CEE region. The internship sparked his interests in the Private Equity industry, in which he decided to specialize in his further academic endeavours. Currently Dominik is pursuing his two-year master's degree in Finance & Investments at Copenhagen Business School. This year, he will also join Deutsche Bank, as a Summer Analyst at Investment Banking Department in London. In his spare time Dominik enjoys traveling, cinematography and ethnic music.



## Sebastian Wieczorek

### Finance/Euro

Sebastian has over three years of experience in corporate finance. Currently he works as an Analyst in the Investment Banking Division of a leading bank in CEE. Previously engaged in the venture capital sector, the capital market and research on the financial institution regulations. He is an alumnus of the Capital Market Leaders Academy.

Systematically uses professional and academic background to leverage various charity and social projects. He is a member of the innovation policy team in The Young Reforming Poland association. While studying he was the vice chairman of the leading student project in the field of monetary policy in Poland. His passion to share knowledge with others caused him to develop an educational project which aims to increase awareness of economics and finance, especially among young people.

Sebastian graduated from Warsaw School of Economics and holds a Master degree in Finance and Accounting with specialization in Banking. He was awarded a best master thesis in the field of economics and finance. In his free time Sebastian writes articles, runs or lifts weights.



## Petra Kaciakova

### Euro

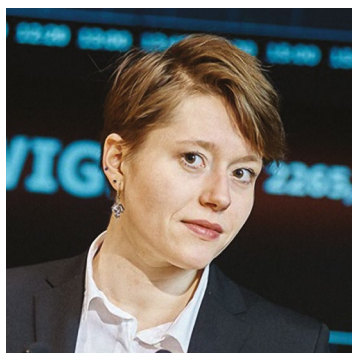
Petra was born in Slovakia, but moved to Prague, Czech Republic, where she is already living for 6 years. She finished bachelor's degree in economics at University of Economics in Prague and is currently finishing master's degree in Law at Charles University. During her studies she participated in different student NGO projects as a project manager or financial director. She is interested in business and investments and is working for small czecho-slovak investment company as a financial analyst engaged not only in analysis, but also in many legal questions targeting the ongoing business. Her hobbies are fitness, weight lifting and travelling.



## Zsombor Incze

### Finance

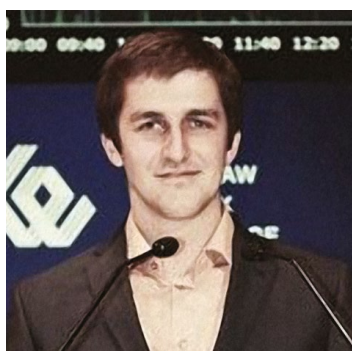
Zsombor was born in Budapest, Hungary. He has a strong interest towards entrepreneurship and capital markets, he has launched his first business as a high-school student. Currently he studies Finance MSc at Corvinus University of Budapest after his BA in Applied Economics. His engagement in student life was topped by serving as the Chief Financial Officer, Member of Directorate at Heller Farkas College of Advanced Financial Studies. He has done several internships in various industries. His most recent internship was at Morgan Stanley's Budapest-based securitized products structuring team where he had focused on residential mortgage backed securities. He still has his business interests in IT/real estate. His scientific achievements include student papers in the topics of SMEs, behavioral finance, FDI or energy. In his free time he likes orienteering, sailing and natural photography.



## Joanna Rycerz

### Energy

Joanna is a lawyer, currently on the last year of Advocates' Training at Warsaw Bar of Advocates. Joanna is scholar of double scholarship of the Rector of the University of Rzeszow for the best students and double scholarship of Lesław A. Paga Foundation in programs Academy of Energy and Academy of Analysis and Media. Joanna is also an alumni of Florence School of Regulation, a Programme Specialised Training Course on Regulation of Gas Markets. Joanna gained experience about the Polish and EU regulations during her work for Polish Energy Regulatory Office, law firms, Polish Power Exchange as well as during course in Florence School of Regulation. Currently Joanna works at Tax & Legal Department at PwC Poland where provides tax and regulatory consulting for energy and oil&gas companies. As an alumni of Lesław A. Paga Foundation she was co-author of numerous publications regarding energy sector and tax law. Joanna is passionate of energy sector and new technologies.



## Tomasz Nisztuk

### Infrastructure

Graduated from Finance and Accounting at the Warsaw School of Economics and from CEMS Masters' in International Management at Bocconi University and Warsaw School of Economics. During his Bachelor studies he completed an exchange program at the City University of Hong Kong.

Although, during studies he never considered working in rail industry, after graduation he became Business Assistant to the CFO of Polish Intercity Railways and became passionate about railways. As Assistant he helped to coordinate implementation of high-speed railways in Poland and supported CFO in daily activities. Currently works as analyst at EY.

Tomasz took part in multiple extracurricular activities such as Youth Reforming Poland. He has reached the finals of EY Financial Challenger, the most prestigious transaction advisory competition in Poland and is a scholar of the Capital Markets Leaders Academy, prestigious fellowship program for young high-potentials. Privately passionate about travelling and mountaineering. Occasionally Tomasz publishes columns on railways, Warsaw and travelling.



## Ondřej Dvouletý

### Entrepreneurship

Ondřej was born in the Czech Republic. Currently he is a doctoral student at the University of Economics in Prague, Faculty of Business Administration, Department of Entrepreneurship. He is interested in entrepreneurship and evaluation of impacts of entrepreneurial policies. Previously he obtained master degree in economic policy at the same University. Ondřej also studies a master degree in Entrepreneurship at Linnaeus University in Sweden. Ondřej is not only theoretically interested in entrepreneurship, he has been also engaged in his own business activity focused on data analysis and econometrics tutoring since 2013. To his hobbies belong sport, geocaching and playing chess.



## Piotr Krzemiński

### Infrastructure

Piotr is currently an entrepreneur, running a family business in Bydgoszcz, Poland. Since 2011 he has been working both in private and public sectors. Among others, he took part in consulting projects in PwC, advised Polish Minister of Infrastructure on road, railway and aviation regulations, and co-managed the market analysis department in Polish State Railways. He graduated from ESCP Europe Business School (MSc) and Poznan University of Economics (BA). Piotr is also engaged in numerous non-profit initiatives such as Lesław Paga Foundation, Civil Development Forum, Youth Reforming Poland association and Toastmasters International. He is passionate about mountain trekking, exotic travels and public speaking.



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