

INTANGIBLE CAPITAL, LEVEL OF ECONOMIC DEVELOPMENT, AND “MIDDLE INCOME TRAP”: WITH SPECIAL REGARD FOR POST-COMMUNIST TRANSITION LEADERS

Jan Winiecki, Łukasz Cywiński, Ruslan Harasym, Robert Pater, Kazimierz Tarchalski

Abstract

The last 10-15 years witnessed an increased interest in the issue of intangible capital in contrast to traditional, tangible, physical capital. It increased understanding of economic growth factors and its inclusion led to reduction of the Solow residual. Experience of well-developed economies show large meaning of the intangible capital for economic growth and structural change. Even though the relative level of intangible capital is smaller in less developed countries, they undergo serious structural changes as they acquire more intangibles. Serious problems arise with measurement of this type of capital. In this article we analyze the effects of intangible capital in post-communist transition leaders on their growth and structural change. We explain the reasons for limited contribution of this capital to growth of these countries and the differences between eastern European countries in this regard. We also recognize the meaning of the intangible capital for the middle income trap. We formulate policy actions that should be taken in order to reduce the gap between high and middle income economies.

Keywords: intangible capital, growth factors, growth convergence, middle income trap, structural change

JEL Codes: E22, E61

Copyright © 2015 by the WSIiZ (University of Information Technology and Management) in Rzeszow. All rights reserved. No part of this working paper may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by information storage or retrieval system, without permission from the WSIiZ

University of Information Technology and Management in Rzeszow, Poland
Wyższa Szkoła Informatyki i Zarządzania w Rzeszowie
ul. mjr H. Sucharskiego 2, 35-225 Rzeszów, Polska
Kontakt: Lukasz Cywinski (lukaszcywinski@outlook.com)

Intangible capital, level of economic development, and “middle income trap”: with special regard for post-communist transition leaders

By

Jan Winiecki[×], Łukasz Cywiński, Ruslan Harasym, Robert Pater, Kazimierz Tarchalski

Table of Contents

Introduction	3
Intangible Capital: Economic Growth, Structural Change And Differences in the Level of Development	4
Tangible and Intangible Investment in New Member Countries of the European Union .	8
Middle-developed, middle income economies and the threat of a “middle income trap”	12
Concluding remarks	18
References.....	18

[×] Ul. Sucharskiego 2, 35-225 Rzeszów, Poland; mailto: winiecki@neostrada.pl

Introduction

Economists have for a long time stressed the importance of knowledge and its application to economic growth and structural change. Already Joseph Schumpeter wrote in 1930s about the waves of “creative destruction” and the role of product and process development, organizational change, management, marketing and finance in generating those waves (Schumpeter, 1934). In this sense the search for the role of the recently discovered importance of intangible capital – in contrast to the historically well-established role of tangible (fixed) capital – has its intellectual roots in Schumpeterian evolutionary economics.

At the same time any economic phenomenon should be measurable to a greater or smaller extent. In the latter sense intangible capital – in spite of its intangibility characteristics – should both be made measurable and put into an already existing accounting framework. Of special interest here is the economic growth accounting framework as intangible capital, when properly measured, contributes to economic growth.

In the methodological/statistical sense the measurement of intangible capital draws on the theorizing and empirics of Edward Denison, Dale Jorgenson, Zvi Griliches and others. Their work resulted in an increased understanding of economic growth factors and reduced so-called residual, that is an unexplained part ascribed to an interaction among the already well established growth factors¹.

The last 10-15 years witnessed an increased interest in the issue of intangible capital (sometimes called also immaterial capital) and its measurement. The basic idea behind the foregoing stems from the fact that various analysts perceived the existence, importance and growth of certain expenditures that are intended to increase output and profits in the future, but cannot be classified as traditional tangible (fixed, physical) capital. In consequence they are not presently made a part of value added in growth accounting, but classified as intermediate input (or “throughput”). One of its consequences is that value added or GDP is lower than it would have been with the proper classification of investments in intangible capital. The calculations in the EU-financed Innodrive project reveal that the aggregate GDP in the European Union of 27 countries would have been approximately 5.5% higher with the inclusion of all investments in intangible capital than the conventionally measured GDP.

But there is a more important distortion involved. Determinants of GDP growth are missing from such accounting due to the fact that intangible investment – in contrast to tangible investment – remains unaccounted for and the extent of its contribution to economic growth is by and large unknown. In this article we discuss caveats of intangible capital measurement, analyze its levels and structure in eastern European economies as well as its role in the development of post-communist transition leaders. Second section contains intangible capital measurement issues and well as its relations with economic growth in high income and middle income countries. The third section includes an analysis of intangible capital levels in the European Union New Member countries. In the fourth section we discuss the “middle income trap” in the light of intangible capital.

¹ More about the past efforts to calculate the size of intangible capital and investment therein can be found in an interesting paper by Jorgen Mortensen and Hannu Piekkola, “Intangible Capital as a Source of Growth: An Introduction”. In: *Intangible Capital – Driver of Growth in Europe*, H. Piekkola (Ed.), Proceedings of the University of Vaasa, Report 167, Vaasa 2011.

Intangible Capital: Economic Growth, Structural Change And Differences in the Level of Development

But what is intangible capital and how to measure investment in intangible capital? As defined by contemporary designers of the most often used methodology (Corrado, Hulten, and Sichel, 2005 and 2006, as well as Sichel, 2008) “intangible investment is expenditures of businesses that are intended to boost output in the future but that are not traditional, tangible, physical capital”.² The very term “intangible” implies, apart from difficulties in measurement, also a much broader range of assets created by investments in intangibles.

And the range is much broader than plant and equipment, means of transportation and buildings, classified traditionally as fixed, i.e. tangible investment, creating easily defined tangible assets. In line with Corrado, Hulten, and Sichel (CHS for short) methodology³ the broad range of intangible investments, that is business spending on intangibles, is divided into three categories, within which further subdivisions are made. They are:

- computerized information;
- innovative property; and
- economic competencies.

According to the presently applicable rules, only a small fraction of intangible investment is taken into account as a part of GDP. Of the first category of intangibles, that is computerized information, it is only software that is included in growth accounting. Other activities, such as creation of data bases, a growing range of applications of cloud computing, etc., are not.

The most varied is the second category called in the CHS framework the innovative property. It includes scientific research and development, encompassing that in the social sciences and humanities, generation of knowledge on mineral exploration and evaluation, costs of copyrights and licenses in the literary and entertainment activities, development expenditures in financial services, as well as architectural and engineering designs. Of these it is only R&D that has been included in the NIPA (National Income and Product Accounts) used to measure US economic growth as of 2013 (with some other countries attempting to follow suit). The rest by and large continues to be calculated as intermediate input not included into value added or GDP.

Research and development is most often studied of all subcategories of innovative property. It is interesting, however, to note (as Sichel, 2008, did) that in spite of all the calls for an increase in the R&D/GDP ratio (see, e.g., EU Lisbon Strategy of the year 2000) and attention lavished on R&D, seen as the main source of innovation, in actual fact research and development contributes a relatively small part of the aggregate intangibles calculated according to CHS methodology.

Investment in organizational capital of firms is the largest sub-category within the third, economic competencies', category. In fact it is the largest subcategory overall. Efforts of management are needed (actually necessary) in adjusting the firm to the changing technology and other changes taking place in the firm and in the market. This particular issue is not new.

² See Sichel, Daniel E., “Intangible capital”. In: The New Palgrave. Dictionary of Economics. 2nd. ed., Ed. by S.N. Durlauf and L.E. Blume, vol. 4, Palgrave MacMillan, 2008, p.391.

³ See, primarily, Corrado, C., Hulten, C., and Sichel, D.E., “Measuring Capital and Technology: An Expanded Framework”. In: Corrado *et al.*, *Measuring Capital in the New Economy*. NBER Studies in Income and Wealth, University of Chicago Press, vol. 65, pp.11-45; Corrado, C., Hulten, C., and Sichel, D.E., *Intangible Capital and Economic Growth*. Finance and Economics Discussion Series paper no. 2006-24, Federal Reserve Board, Washington D.C., 2006.

In 1981 an economist presented his study of the Swedish manufacturing industry over the decade of 1970s, calculating how important such adjustments had been for the productivity gains from new technology. Bo Carlsson (1981) revealed that technological change alone contributed in between 20-30% and 60-70% to the aggregate productivity growth. All the rest had been the result of accompanying organizational changes, combined with training of the personnel, etc. Thus, technological change (more often than not considered to be the outcome of R&D activities) should not be seen as the one and only source of the growth of productivity among intangibles. A large range of investments in intangibles (although they were not called so in Carlsson study) are important co-investments that contributed at least as much to productivity growth as (presumably R&D-generated) technology itself.

However, the variety and other characteristics of the intangibles pose serious challenges to measurability of these investments. However, the variety of their characteristics pose serious challenges to measurability of these investments. Some challenges have been overcome by better calculating methods as well as forced the researchers to roughly estimate proportions of expenditures that were building value in the longer run (beyond one year range) and expenditures that helped increase current sales (within one year). Examples of such agreed proportions consist of advertising and market research. The foregoing proportions were not off-the-cuff numbers, but results of numerous studies of the aggregate expenditures in various categories of activities. Let us stress the point that in this intangibles often differ from tangible investments that can be, so to say, easily “seen and touched”.

Yet there is no doubt whatsoever that such intangibles create value for the future, as for example product and process developments in the financial sector. Innovative property arrangements, combined with computerized information and managerial adjustments, undoubtedly contributed to the emergence of 24 hours/7 days a week online banking for customers. They were a major step forward in both efficiency and service expansion of banking services in the long run.

With the rapidly spreading acceptance of CHS methodology of estimating expenditures on intangible capital, a number of empirical studies that show country time series and cross-country comparisons have begun to be published. A caveat is needed: the measurement of expenditures on intangibles covers the market sector expenditures only.

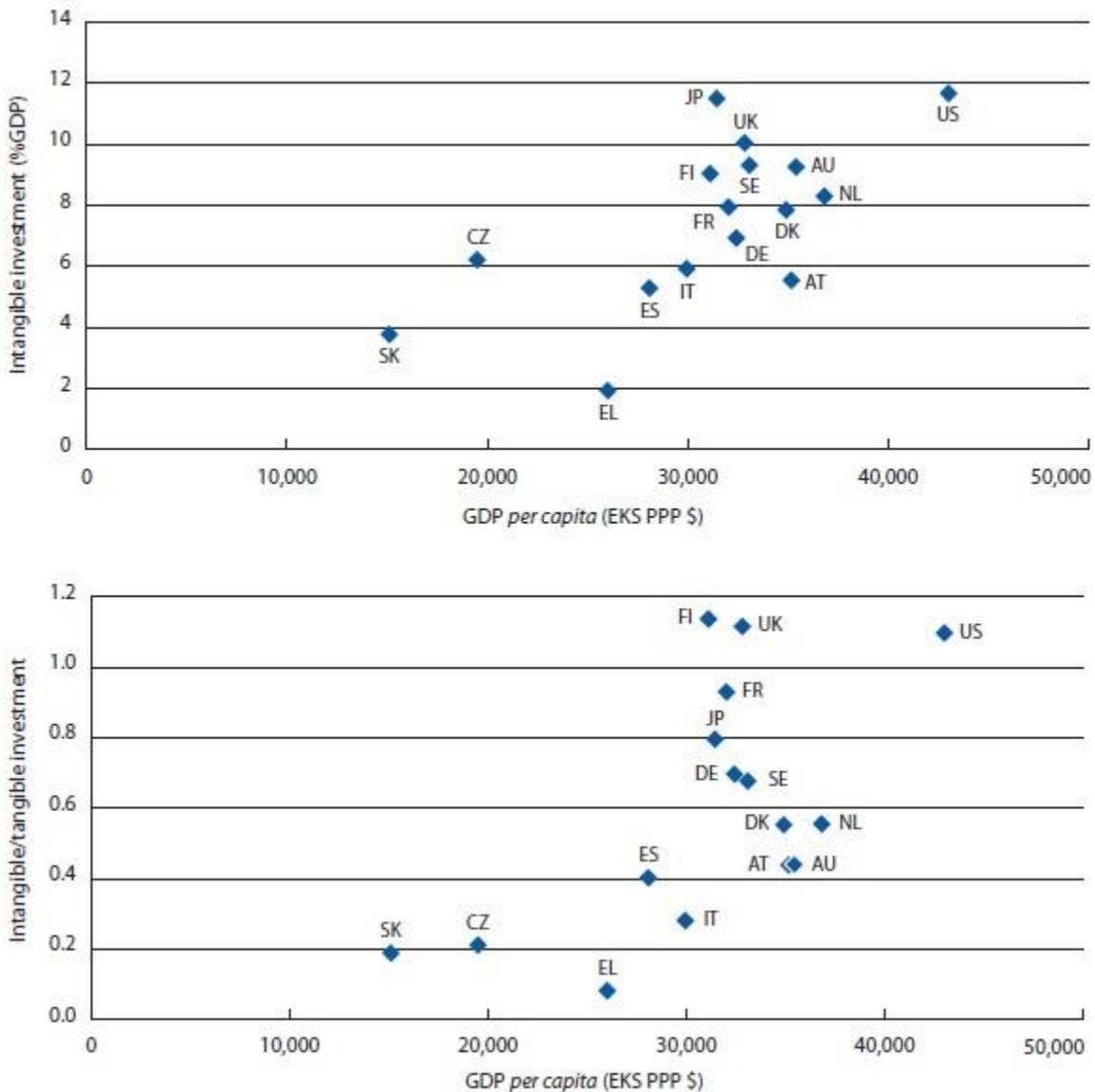
More importantly, these publications revealed certain characteristics of investments in intangibles that are – in our opinion – of high significance for the research on and hypotheses concerning determinants of the role of intangible investment in the process of economic growth and structural change. Also, they should be of help in considering the issue of how to avoid the “middle income trap” considered also in this article.

A series of country and comparative studies applying CHS methodology yielded important generalizations concerning relationship between the volume of intangible investment and level of economic development. Two of them are of special importance both in general analysis and with respect to this article.

The first is a statistically established positive correlation between the volume of intangibles relative to GDP and the level of economic development measured by GDP per capita. On the whole, the higher the GDP per capita level, the higher the intangible investment/GDP ratio.

Bart van Ark and his collaborators (van Ark, Hao, Corrado, and Hulten, 2009) compared all studies available at the time, mostly of highly developed economies and a few of middle developed economies, and established strong positive association between the two variables in question. The scattergram in Figure 1 presents graphically the association in question.

Figure 1 Intangible investment and GDP per capita (2001-04)



Source: van Ark, Hao, Corrado, and Hulten, 2009.

The reasons as to why intangible investment is of lesser importance for less developed or even middle developed economies are varied, but all leading to similar conclusion. Economies that are at the early or even middle stage of industrialization depend on different drivers for their economic growth and associated structural change. First, their development depends primarily on the availability of low skilled, low wage labor force, largely moving out of agriculture into labor-intensive branches of manufacturing. Such labor does not require for their performance large quantities of sophisticated intangible investment!

Next, at that stage of economic development their demand for technology is limited to easily mastered standardized, off-the-shelf technology. It is available on the world market or applied by subsidiaries of multinational firms in the so-called export platforms established for the production and exports of

standardized (nowadays they are often called “commoditized”) manufactured products in less or middle-developed economies.

Unsurprisingly, then, intangibles are concentrated in highly developed economies. For example, even now – with all the trumpeted competition from the BRIC countries – the five largest Western economies account for almost 60% of world expenditures on research and development. But R&D expenditures are just one component of intangibles. Less developed and middle-developed economies need also less of other components of intangibles.

Thus, the concentration of investment in software and data bases is not much less concentrated in highly developed Western economies than R&D (in spite of strong competition from India and increasingly China). Furthermore, investment in intangibles belonging to the category of economic competencies of the firms is also tilted in favor of rich, highly developed economies. Large firms, firms in sophisticated industries, as well as multinational firms operating in a number of countries emerge usually at higher levels of economic development.

There is, however, no sharp divide in intangible investment/GDP ratio between middle-developed and highly developed economies. The ratio, or a share in GDP, of intangibles tends to grow over time and along the GDP per capita level. Accordingly, the same economy – already classified as highly developed – tends to increase the intangible investment/GDP per capita ratio as its GDP per capita continues to grow. Thus, the path-breaking studies of the US (Corrado, Hulten, and Sichel, 2005, 2009) revealed that in the 1973-95 period the average intangible investment to GDP ratio amounted to 9.4%, while in the subsequent period of 1995-2003 the ratio in question increased to 13.9% (also annual average). Of course, not all categories of intangibles grew at the same rate. For example, the computerized information grew the fastest and increased its computerized information/GDP ratio from 0.8% to 2.3%, while firm-specific economic competencies grew from 3.5% to 5%.

Another important trend has been revealed as well, in fact a parallel trend. As economies grow and their GDP per capita level increases, structural change continues to take place. The share of manufacturing in GDP and employment usually declines, while that of market services increases. The growing ratio of intangibles to GDP should be looked at also from that perspective. Early studies tend to show also a marked increase in intangible investment in the fast growing sector of market services (Uppenberg, 2011). Importantly, it is the sector whose share increases not only in terms of output, but also in employment.

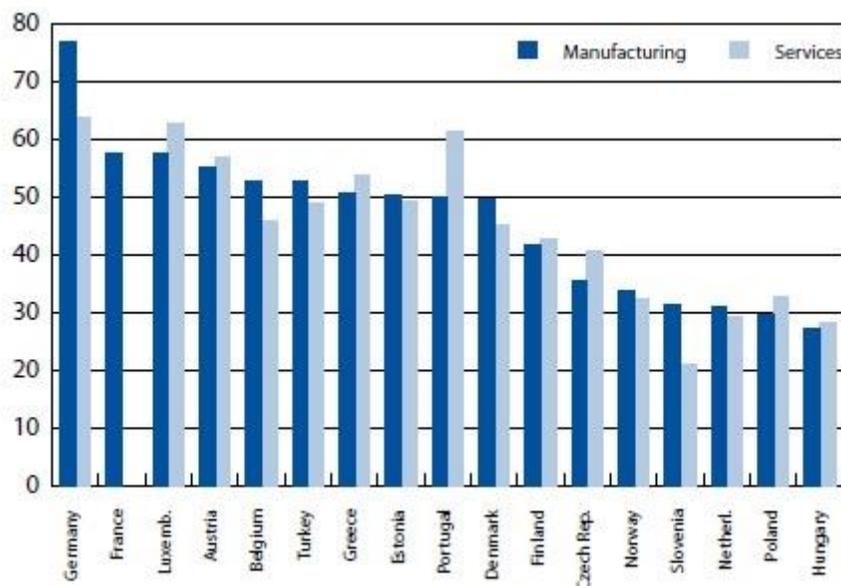
However, the recent research revealed also a difference in composition of intangibles between manufacturing and market services. For example, the R&D expenditures are more heavily concentrated in manufacturing. The foregoing suggests that intangibles in manufacturing are more oriented toward product and process innovations, generated by R&D, while intangibles in market services are more concentrated on innovative property arrangements, brand equity support, especially marketing, upgrading the skill of the personnel, as well as creating and applying organizational innovations. The latter are also legitimate innovations, covered by the recent, third revised edition of the so-called Oslo Manual on innovation. The manual recognizes four broad categories:

- Product innovation;
- Process innovation;
- Marketing innovation; and
- Organizational innovation.

Within the foregoing classification differences emerge between manufacturing and market services. Figure 2 presents data on innovating firms across two major sectors considered here: manufacturing and

market services, in the area of marketing and organization. These proportions in both sectors look differently (more on that in Uppenberg and Strauss, 2010).

Figure 2 Non-technological innovators (as a percentage of all firms, 2004-06)



Source: Uppenberg and Strauss, 2010

These differences are going to increase in importance, taking into account the earlier stressed trend of the growing share of market services relative to manufacturing in output and employment.

Broad sectoral generalizations apart, the foregoing differences do not exclude the existence of country-specific differences. Thus, the distribution of intangibles between two major sectors is sharply different between e.g. the United Kingdom and Germany. In the former only a quarter of aggregate intangible investment has been taking place in manufacturing as against more than half in Germany (Haskel and Pesole, 2011). However, the difference between countries broadly at the same level of GDP per capita becomes less surprising if we keep in mind that the share of manufacturing in GDP amounts in the UK to about half of that in Germany. The foregoing should remind us that intangible investment is not the one and only determinant of economic growth, nor of structural change.

Nonetheless, the foregoing ratio suggests at the same time that Germany are far behind the United Kingdom in terms of intangible investment in the fast growing market services – and accordingly in the aggregate intangibles to GDP ratio: 7.2% in the former vs. 10.5% in the latter. Because of structural change, the importance of growth-promoting intangibles in market services in generating economic growth in high income economies has continued to increase.

Tangible and Intangible Investment in New Member Countries of the European Union

Early empirical studies on intangibles concentrated on the highly developed, high income economies (see their review, e.g., in van Ark, Hao, Corrado, and Hulten, 2009). The middle- developed, middle income economies were a rarity. In fact, in the quoted review study calculations only three such countries were included (Czechia, formally Czech Republic, Slovakia, and Greece). A quantitative breakthrough came with a large EU-financed project called Innodrive that covered all member countries of the Union plus Norway

and presented calculations, applying the same CHS methodology.⁴ The project that was completed in 2011 and covered the 1995-2005 period not only offered a static picture of intangibles across countries, but also a medium-term evolution of their ratio to GDP for each country covered by the project.

In this article authors decided to concentrate on the narrower group of countries, that is, selected middle-developed, middle income economies from East-Central Europe. The analysis covers primarily 8 countries: Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia (in alphabetical order). They were earlier classified as post-communist transition leaders and later were rewarded for their successful efforts by becoming first post-communist economies that achieved full membership in the European Union. They were prized both for their institutional progress and economic performance, including foreign trade, or more widely, external performance – that has been better not only than the performance of “old” EU members, but also better than world foreign trade performance (see, i.a., Competitiveness of New Europe, 2009).

We have decided that it is worth looking at a given group of high performers also from the vantage point of their creation of intangible capital in the process of economic growth and structural change. We stress structural change since middle-developed, middle income economies tend to acquire more intangibles as they not only grow, in terms of GDP per capita, but also change their output and employment structure in the direction of a greater share of market services’ sector. The level of intangibles is not as high as in highly-developed, high income economies, but it is by and large increasing over the 10 years’ period for all countries in question (see Table 1 below).

As stressed in the preceding section, the ratio of intangibles to GDP grows in the process of the increase in GDP per capita. It is not, however, a linear process. Nor is it a process independent of other contributions to economic growth, primarily the contribution of tangible capital (better known in economic accounting as gross fixed capital formation – GFCF). We noted in the preceding section that in highly developed, high income economies the share of tangible capital in GDP tends to stabilize or even decline, while intangible capital continues to grow in terms of intangibles to GDP ratio. In the quoted US example the latter ratio reached in the 1995-2003 period on average 13.9% GDP.

Nonetheless middle-developed countries differ markedly from highly developed countries also in this respect. In highly developed, high income countries the tangible/intangible ratio, measured in GDP, ranges between 2:1 and 1:1 (the latter registered in the US, Japan, or UK). However, the former countries display different structural characteristic from the highly-developed, high income group. The share of manufacturing in GDP in the middle-developed, middle income group is usually higher, sometimes markedly higher.

There is nothing surprising here. Economic growth in middle-developed economies is still primarily driven by manufacturing. This sector is either close to its peak share in GDP or have already reached the peak and whatever structural change takes place therein, it occurs within the confines of the stable – or already declining – manufacturing share (see Winiecki, 2014). Given the foregoing, gross fixed capital formation plays a very important role in economic growth of these countries.

Thus, it is not surprising that among the 8 countries primarily considered in this section the share of tangible capital (GFCF) is much higher than that of intangible capital. It ranges between 5:1 and 3:1, with two notable exceptions, Czechia and Hungary. Each exception is different though. Czechia is often classified as a post-communist economy being the closest to mature Western (highly-developed, high income) economies. It is not surprising, therefore, that with respect to its intangibles/GDP ratio, as well

⁴ See, in particular, a collection of papers, H. Piekkola (Ed.), *Intangible Capital – Driver of Growth in Europe*. Proceedings of the University of Vaasa, Reports 167, Vaasa, 2011.

as tangible/intangible capital ratio it also resembles mature Western economies. The latter ratio is also close to 2:1, that is typical for the latter economies.

Hungary is a more difficult case to interpret. It is also a post-communist economy with a high intangibles/GDP and low tangibles/intangibles ratios, but the latter ratio is largely due to a rather low absolute share of tangible capital (GFCF) in the market sector (12-14% GDP only). Thus, it is probable that the low share of GFCF is due to other factors such as macroeconomic and/or other policy errors, which might have resulted in markedly lower or even negative economic growth, and in consequence – also lower level of tangible investment.

Returning to basic proportions with respect to the intangible investment in 8 countries in question, the Innodrive project allowed – as stressed already - to calculate them for all these countries for the 1995-2005 period. The statistics based on this project are presented in Table 1.

Table 1 The Intangible Investment/GDP Ratios in % in 1995, 2000, and 2005 for the Eight Countries (ranked from top ratio down)

Country	1995	2000	2005
Czechia	5.4	6.6	7.6
Hungary	5.8	7.0	7.3
Slovenia	6.0	6.8	7.0
Slovakia	3.2	5.8	6.4
Estonia	5.1	4.6	5.2
Latvia	2.8	3.8	4.7
Poland	3.0	4.8	4.6
Lithuania	2.4	3.2	4.0

Source: Calculated by C. Jona-Lasinio, M. Iommi, and S. Manzocchi, Intangible capital and productivity growth in European countries, February 2011, from Innodrive project data.

An interesting feature of statistics in Table 1 is the differences of intangibles/GDP ratios among the countries in question that are larger than the differences of their GDP per capita ratios. In fact, the same may be said about highly-developed, high income economies of the West. To add yet another feature, some post-communist countries with high intangibles/GDP ratios register higher ratios than some highly developed, higher income Western economies. This latter feature is revealed in Table 2, ranking 10 EU member countries with the highest intangibles/GDP ratios.

*Table 2 Ranking of the Top Ten EU Countries in Accordance with Their Intangible Capital/GDP Ratios in 2005
(Middle-developed countries under consideration in italics)*

Country	IC/GDP Ratio
Sweden	9.1
United Kingdom	8.9
Belgium	8.1
France	7.6
Czechia	7.6
Netherlands	7.5
Finland	7.3
Hungary	7.3
Denmark	7.1
Slovenia	7.0

Source: See Table 1.

So far we have largely been stressing certain similarities and continuities both within the group of eight former post-communist transition leaders and in comparison with mature, highly developed Western economies. At this point we would like also to stress certain differences, apart from the obvious one stemming from a relatively high positive correlation between the IC/GDP ratios and GDP per capita levels.

These differences are noticeable at less aggregated levels than intangible investment as a whole. For example, the middle-developed economies differ from highly developed ones in terms of proportions between the shares of two largest basic categories of intangibles, that is innovative property and economic competencies of firms. In highly-developed economies these proportions are roughly equal, while in middle-developed ones a share of intangibles in economic competencies is markedly higher (again, with the exception of Czechia, where the proportions are closer to those in highly-developed economies).

At the even more disaggregated level, other often large differences may also be discerned. In the most important case, research and development, including that in social sciences and humanities, contributes sharply different shares to intangibles in highly developed and middle-developed economies.

Except for two countries regarded as parts of the former group (Italy and Spain), the contribution of extended R&D to intangibles in terms of their ratio relative to GDP has been dramatically different. Following the already quoted survey by van Ark, Hao, Corrado, Hulten (2009) the contribution of R&D to the intangibles, measured in terms of GDP, fluctuated in highly-developed economies between 1.0% and 2.0%. In Italy and Spain it was only around 0.6%. However, the same ratio for the middle-developed post-communist transition leaders was very much smaller (again, except for Czechia). Elsewhere, it fluctuated around barely 0.2% GDP!

Such large differences require an answer. However, answers to intra-intangibles' differences are going to be dealt with in the following section as they seem to be important for the next major issue to be considered in this article. Namely, whether middle-developed, middle income economies – including the

8 East-Central European countries under consideration here – face an intellectually fashionable, but not well defined so-called “middle income trap”⁵ on their path to become highly developed, high income economies.

To close this section we would like to mention also the structural change-related issues. For example, Uppenberg (2011) calculated that there are large differences in the contribution of each major sector to the aggregate productivity growth of national economies across three geographical areas: middle-income new member countries (the 8 countries under consideration plus Malta and Cyprus), “old” EU member countries (EU-15) and the United States. Thus, in the middle-developed, middle income economies market services contributed 17% to the aggregate productivity growth, in the EU-15 group 35%, while in the US market services contributed the overwhelming share of 57%. Uppenberg rightly stresses the importance of economic structure, apart from the growth rates of sectoral productivity. For although output and employment in the market services’ sector in middle-developed economies in question grew in the period under study, the shares of that sector were still lower or significantly lower than in “old” Europe (to say nothing about the United States).

Middle-developed, middle income economies and the threat of a “middle income trap”

In the opinion of the authors of this article, the meaning of the said middle-income trap should be clarified as follows. First, we should look at manifestations of such a phenomenon and define the level of development of countries that could be affected by the said threat. A good starting point is the definition of such manifestations as “sustained slowdowns [of economic growth] in increasingly mature economies” (Eichengreen, Park, and Shin, 2011).

The authors in question studied all cases of fast growing economies since 1957 that already reached what we call middle-income level and they call increasingly mature economies, which subsequently registered periods of sustained slowdowns in economic growth (at least 2.5 percentage points annually over the 7 years’ period). As far as the level of development of affected countries is concerned, the average GDP per capita of these countries ranged between 15-17 thousand 2005 US\$ in international (PPP) prices.

Shifting from manifestations to sources of such slowdowns, Eichengreen, Park, and Shin point first to proximate sources, which they empirically define as a dramatic decline in total factor productivity (TFP) growth. They point out that 85% of GDP growth slowdown is explained by TFP slowdown.

Next, they shift from proximate to original sources and single out two such sources. The first is the end of a stage of economic development (more precisely: the industrialization phase), when workers shift from low productivity agriculture to higher productivity manufacturing. With the end of that phase, the major source of productivity growth disappears. The second source is less precise in terms of timing, but no less important. It is the declining ability of such economies to be benefit from the available standardized technology (either easily obtainable off-the-shelf technology or that applied by multinationals in their export platforms established in such economies). As these economies reach the stage of development Eichengreen, Park, and Shin define as being “increasingly mature”, while we define as approaching or already reaching middle-developed, middle income level, they are under increasing pressure to develop

⁵ See, in particular S. Aiyar *et al.*, Growth Slowdowns and the Middle-Income Trap, International Monetary Fund working paper, Washington, D.C., March 2013. The categories of variables taken into consideration do not seem to be well defined, as for example the separate categories of macroeconomic fundamentals, including the size of government, and institutions, including property rights and regulations.

their own, original technologies. Or, at a minimum, show the ability to significantly upgrade the technology obtained from external sources.

In conclusion, the failure of finding new sources of productivity growth once the old ones accompanying the industrialization process have been exhausted, is the main cause of the sustained slowdowns creating in turn the “middle-income trap”. We would add to the foregoing also the inability to find ways to expand the human capital-intensive market services, that is to pursue structural change at a new, higher level of development (measured by GDP per capita).

Even with the added structural change context, however, a well-defined and empirically supported hypothesis of Eichengreen, Park and Shin is – in our view – incomplete. For these authors tend to neglect non-economic (institutional) determinants of barriers to continuous high, or reaccelerating, economic growth of middle-developed economies.

Here comes to the rescue an institutional strand of economic thinking, pointing to such determinants (or at the very least enabling factors). Thus, Fatas and Mihov (2009) note the existence of what other call middle-income trap, but stress that main barriers to further growth leading to the high income level result from the low quality of institutions.

Like Eichengreen, Park, and Shin later, they note the recurrence of economic slowdowns once economies reach certain level of GDP per capita range (for them it is 10-12 thousand 2007 of international US \$). Many economies, given their weak institutions, get stuck at about that level that these two authors call “the Great Wall”, in an obvious reference to future problems of China as it approaches that income level. For they see serious problems with weak, low quality Chinese institutions. Countries that surpassed “the Great Wall” – they say – have all been benefiting from possessing high quality institutions.

What Fatas and Mihov present above corresponds to what one of the authors of this article wrote recently (see Winiecki, 2014 and 2015 forthcoming). He stresses that countries undergo two major structural transformations within the ongoing process of economic growth. In contrast with the first, that is industrialization, the second, the shift in the growth engine role from manufacturing to human capital-intensive market services requires not only economic freedoms, but also civic freedoms and even political freedoms (they together are defined differently by Fatas and Mihov as high quality institutions).

To offer an example, in the latter structural transformation both phases: research resulting in invention and subsequent innovation of business firms depend on institutions and policies (within the framework of these institutions). Thus, invention requires freedom: from choosing the topic of research, to unshackled debate, to publishing the results. Finally, to being able to express freely oneself not only within the relatively narrow confines of a professionally pursued subject, but also with respect to wider ramifications of that subject.

The fear of repression greatly reduces the unshackled debate, as well as prospects for achievement. Moreover, not only scientists and technicians working on R&D, but also academics working in humanities, scholars and artists licensing their works, advertisers, market researchers and other – all need a wide range of freedoms in pursuing their activities.

Being protected from petty vengeance and more serious encroachments of the rulers and their henchmen matters. Otherwise their ability to create both intangible capital is going to suffer, reducing the dynamics of economies affected by the deficit of freedoms.⁶

⁶ Interestingly, Connors (2012) tested Winiecki’s hypothesis of the importance of non-economic freedoms (he calls them “democracy-related freedoms”) for overcoming “the Great Wall” – or alternatively middle-income trap – and

In such a wider economic and political framework of analysis it is easier to see the similarities and differences between countries and groups of countries in terms of their ability to overcome the middle-income trap or, alternatively, “the Great Wall”. Thus, it is our opinion that a group of East-Central European countries under consideration – that is all eight countries listed above – have successfully passed the test of the quality of institutions. Even if their institutions are far from being perfect, the major institutional progress has been, so to say, confirmed by being the first post-communist countries that became in 2004 full members of the European Union.

The caveat should be made, of course, that no institutional arrangements are lasting forever. There is always a danger of institutional retrogression that would recreate the barriers to becoming a highly developed, high income economy. And signs of the existing or prospective retrogression are appearing in some countries in question. By and large, however, barriers faced by the above group of countries are predominantly economic and whatever institutional and policy changes are required to overcome these barriers concern primarily economic freedoms.

This is not always the case with other middle income or approaching middle income economies. In his study of the BRIC group of countries Winiecki (2012 and 2015 forthcoming) stressed that some countries of the group, apart from their economic problems related to insufficient economic freedoms, face a major problem with the absence of other freedoms: civic and political, which strongly reduce the probability of overcoming “The Great Wall”. He pointed out that these countries are primarily Russia and China. In fact, Russia had already failed to overcome “the Great Wall” in its earlier institutional guise as the Soviet Union. And both present day Russia and China failed so far to introduce the level of freedom, i.e., to create institutions of sufficiently high quality, to set the stage for the next major structural transformation and the advancement to the club of highly developed, high income countries.

Given the above juxtaposition, an opinion may be formulated that the eight former post-communist transition leaders are in a relatively advantageous position in their attempts to advance to the Western club of highly developed economies. The nonexistent – or at most weak – non-economic barriers create better environment in which to tackle the middle income trap. A weakly defined (see above) middle income trap is concentrating on economic freedoms. Thus, our remaining considerations will concentrate on economic issues.

We return at this point to the intangibles and the differences in intangibles between middle-developed and highly developed economies. These differences may offer us some clues as to the deficiencies, or at least inadequacies, in the former economies. Let us repeat what we pointed out in the preceding section about different proportions between two major categories of intangibles in highly developed and middle-developed economies. In highly developed economies innovative property type of intangibles are roughly equal in terms of their ratios to GDP with economic competencies of the firm, while in middle-developed economies the latter are usually markedly larger.

There is a number of interrelated factors that may help to explain the difference. First of all, intangibles are created in the process of investment, also of tangible investment. As the middle-developed economies display much higher tangibles/intangibles ratio, given the large role of manufacturing in these countries, intangibles accompany to a much greater extent the tangibles. Please, note the already quoted early study by Carlsson (1981) that the productivity increase resulting from new technology contribute between the 20-30% and 60-70% of the aggregate increase in productivity.

found strong support for the hypothesis. Also, research by Knutsen (2015) supplies an indirect evidence that countries with high quality institutions (he calls them democracies) tend to grow faster than autocracies.

In our present terminology the foregoing shares are those of tangible investment, while all the rest of the productivity comes from associated intangible investment. The larger share of tangible investment generates also larger share of intangible investment belonging to the sub-category of economic competencies of the firms. New tangible investment, associated with the new technology, requires adaptive processes within firms to realize its potential.

The major share within the sub-category of economic competencies of the firm is held by what we call organizational capital that in CHS methodology covers two sub-categories: firm specific human capital and organizational structure. The former covers various forms of training, while the latter presents involvement of an important share of managerial/marketing personnel in absorbing, adapting, and upgrading the technological change. The large role of manufacturing in middle-developed economies ensures higher demand for and, consequently, higher supply of intangibles in the form of firm-specific human capital and organizational structure, accompanying the introduction of new technologies.

The foregoing relationship is well established empirically. Table 3 presents ratios of organizational capital in the selected highly-developed and middle-developed economies. The ratios in question are presented in terms of their percentage of GDP and, therefore, underestimate the relative importance of organizational capital in middle-developed economies. For aggregate intangible capital measured by its ratio to GDP increases as the economy grows and reaches higher GDP per capita levels and, therefore, highly developed economies register higher ratios.

There is yet another distinguishable feature present in middle-developed economies associated with the organizational human capital. Intangibles in organizational structure appear in firms in two ways. It may be involvement in the actual management of the firm or it may be purchased from outside (expertise, consultancies, etc.). Middle-developed economies, in their efforts to catch up with highly developed competitors invest more tangibles in their manufacturing and other competitive sectors. They also generate more accompanying intangibles.

Moreover, the foregoing processes in middle-developed economies take place with a greater or smaller involvement of foreign direct investment (see, for example, Uppenberg, 2011, on new EU member countries). The participation of foreign firms, often large multinationals, affects – in our opinion – both the share of organizational capital and the proportions between purchased and own account organizational structure sub-category. The technological/organizational distance between a multinational and a taken over local firm is usually greater than in the case of a domestic takeover. Therefore, purchased organizational capital would normally be higher relative to corresponding own account efforts in these areas.

Table 3 Firm-specific Human Capital in Selected Highly-developed And Middle-developed economies In Terms of Its Ratio to GDP

Country	Ratio to GDP
Highly developed economies	
France	1.51
Denmark	1.49
Germany	1.29
Austria	0.79
Italy	1.02
Spain	0.81
Middle-developed economies	
Latvia	2.89
Hungary	2.83
Estonia	2.73 a
Czechia	2.28
Slovenia	2.06 b
Poland	1.81
Slovakia	1.63
Lithuania	1.46

a – 2004 b – 2003

Sources: For highly-developed, see van Ark, Hao, Corrado, and Hulten, 2009; for middle-developed, see Cywinski and Harasym, 2014, mimeo, all on the basis of Innodrive project data.

These are important indicators that underline the difference today between middle-developed and highly developed economies in terms of their tangible/intangible investment characteristics. Which indicators, however, would be appropriate tomorrow? That is if we would like to monitor prospects for reducing the gap between the GDP per capita of countries under consideration and the countries that long ago reached their present highly developed economy status?

The most obvious would be to monitor innovativeness indicators and, from the intangible capital perspective, first of all the contribution of R&D to the creation of intangible capital, measured in terms of percentage of GDP. We stressed in the preceding section the large distance between the R&D contribution in highly developed and middle-developed economies (except for Czechia, whose contribution again was closer to highly-developed than to other middle-developed countries under consideration.

A gradual increase in the contribution from very low levels in the 1995-2005 period would signal the greater maturity in creating intangible capital through research and development. Primarily in creating innovative product, process, marketing, and organizational innovations rather than absorbing and, at best, adapting the solutions purchased from others.

It is worth stressing that contrary to general tendency of thinking about innovation in terms of national systems, concentrating on national firms and public support for these firms, the available empirical material suggests the opposite. Namely, it suggests that it is foreign-owned or at least partly foreign-owned firms that contribute most in middle-developed countries to business financed R&D (see, e.g., Jurajda and Stancik, 2011, for Czechia, and Swiadek, 2015, for Poland). Greater interaction of public authorities with these, often very large firms, would undoubtedly help in increasing the R&D base in these countries (this is, in fact, what Hungarian governments were successfully pursuing for a long time).

And, while we are considering the role of country's policies for the innovativeness of firms, it is worth stressing one supply side issue that remains – to some extent – within the realm of influence of the state. We have in mind the supply of university graduates in science and engineering, an issue which becomes important as trendy preferences tempt students in other directions. Table 4 suggests that there are sharp differences across the 8 countries in question in terms of the share of science and engineering graduates in the total supply of university graduates.

Table 4 The Share of Science and Engineering Graduates In the Supply of University Graduates in 2001 in %

Country	Percentage
Lithuania	25.6
Slovakia	25.6
Czechia	22.0
Slovenia	20.2
Estonia	18.1
Latvia	12.1
Poland	10.4
Hungary	10.0

Source: Kos, 2003.

Although there have been some changes, at times even deliberate efforts to increase attractiveness of science and engineering studies, the basic proportions did not change much. And it becomes quite obvious that, e.g., successes of the Hungarian governments in attracting high level research, development, and other establishments of various major multinationals are based on a narrow domestic human capital base.

Coming back to more general issues of intangible capital, R&D in science and humanities are just one component of the larger category of intangibles classified in CHS methodology as innovative property. Innovative property, apart from R&D, encompasses a wide range of arrangements in mineral exploration and evaluation, in new architectural and engineering design, in issuing copyrights and licenses, or in innovative arrangements in such sectors as the financial industry. An increased activity across that very wide range of innovative property arrangements would signal the catching up process considered here.

In the preceding section we noted that in highly developed economies the proportions between the intangible capital created in these innovative property arrangements and the capital created in the area of economic competencies of the firm have been roughly equal in terms of their share in aggregate intangible capital. A shift in the direction of such proportions from the present state of the dominance of economic competencies of the firms would also be an indication of evolution in the right direction. The list could easily be made longer but at the cost of further increasing the size of this article – still preliminary in both its indicators and conclusions.

Concluding remarks

Intangible capital is an important source of economic growth. Firms that are in the centre of innovative growth, increase their economic competencies, produce specialized software and other intangibles. Hitherto, with some distinct exceptions in most of the eastern European economies it has not been a major factor. However, these countries undergo serious structural changes as they acquire more intangibles. This process will intensify in the following years with decreasing dynamics of fixed capital investments. Most of the eastern European countries also share common features in the intangible investment structure, which differentiates them from highly developed countries. Among outliers there are Czechia and Hungary, with certain structural characteristics, discussed in the article. We also contributed to the discussion on the “middle income trap” by pointing on the importance of institutional background and structural changes, that are also connected to the intangible capital acquisition.

Intangible capital has to be carefully monitored. It should be supported by economic policy by diminishing the barriers to its growth. Careful monitoring the level of intangible capital and its components might contribute to the knowledge about structural changes in the economies, and also the cyclical changes, especially in industrial and service sectors.

References

- Aiyar, S. – Duval, R. – Puy, D. – Wu, Y. – Zhang L. (2013): Growth Slowdowns and the “Middle-Income Trap”. International Monetary Fund working paper, March.
- Connors, J. (2012): Economic Freedom, Democracy, and Economic Performance. Department of Political Science Working paper no. 26, Duke University, November.
- Corrado, C. – Hulten, C. – Sichel, D.E. (2005): Measuring Capital and Technology: An Expanded Framework. In: Corrado (ed.): Measuring Capital in the New Economy. NBER Studies in Income and Wealth, Chicago: University of Chicago Press, 65: 11–45.
- Corrado, C. – Hulten, C. – Sichel, D.E. (2006): Intangible Capital and Economic Growth. Finance and Economics Discussion Series paper no. 2006-24, Federal Reserve Board, Washington D.C.
- Cywinski, L. – Harasym, R. (2015): Intangible capital in Poland in comparison with East-Central European developments. Rzeszow: University of Information Technology and Management, mimeo.
- Eichengreen, B. – Park, D. – Shin, K. (2011): When Fast Growing Economies Slow Down: International Evidence and Implications for China. NBER working paper series No.16919.
- Fatas, A. – Mihov, I. (2009): Another challenge to China’s growth. <http://fatasmihov.blogspot.com/2009/03>.
- Fatas, A. – Mihov, I. (2009): The Four I’s of Economic Growth. INSEAD.

- Gorzig, B. – Piekkola, H. – Riley, R. (2011): Production of intangible investment and growth: Methodology in INNODRIVE. Innodrive working paper no.1. February.
- Haskel, J. – Pesole, A. Within-country analysis of intangible assets and investments at sector-level. A Co-Invest Project Report. 93–132. See, [http://www.ceriba.org.uk/pub/Coinvest/Coinvest Projects/Coinvest_217512_D10.pdf](http://www.ceriba.org.uk/pub/Coinvest/Coinvest%20Projects/Coinvest_217512_D10.pdf).
- Jona-Lasinio, C. – Iommi, M., – Manzocchi, S. (2011): Intangible capital and productivity growth in European countries. Innodrive working paper no.10, February.
- Jurajda, S. – Stancik, J. (2011): Organization and Firm Performance in the Czech Republic. InnodriveWorking Paper no. 12, February.
- Knudsen, C.H. (2015): Why Democracies Outgrow Autocracies in the Long Run: Civil Liberties, Information Flows, and Technological Change. *Kyklos*, 68(3).
- Kos, M. (2003): Competitiveness and Productivity in New Member Countries. A paper prepared for CRCE 2003 Bled conference on the post-communist economies, mimeo.
- Piekkola, H., (2010): Intangibles: Can they explain the unexplained? Innodrive working paper no.10, May.
- Piekkola, H., (ed.) (2011): Intangible Capital – Driver of Growth in Europe. Proceedings of the University of Vaasa. Report no. 167, Vaasa.
- Sichel, D.E. (2008): Intangible Capital. In: Durlauf N.S. –Blume L. E. (eds): *The New Palgrave. Dictionary of Economics*. 2nd ed., 4: 391–3.
- Swiadek, A. (2015): Aktywnosc innowacyjna przedsiebiorstw zagranicznych i krajowych (Innovative activity of foreign-owned and domestic enterprises). *Gospodarka Narodowa*, 85(2).
- Uppenberg, K. (2009): Innovation and economic growth. *EIB Papers*, 14(1): 10–35.
- Uppenberg, K. (2009): The knowledge economy in Europe. A review of the 2009 EIB Conference in Economics and Finance. European Investment Bank.
- Uppenberg, K. (2011): Economic growth in the US and the EU: A sectoral composition. *EIB Papers*, 16(1).
- Uppenberg, K. – Strauss, H. (2010): Innovation and productivity growth in the EU services sector. European Investment Bank, July.
- Ark, van B. – Hao, J.X – Corrado, C. – Hulten, C. (2009): Measuring intangible capital and its contribution to economic growth in Europe. *EIB Papers*, 14(1): 62–93.
- Winiiecki, J. (2012): Russia and China Facing the “Great Wall”. *Post-Communist Economies*, 24(3).
- Winiiecki, J. (2014): Przekształcenia strukturalne w procesie rozwoju gospodarczego: Modyfikacje i rozszerzenia (Structural changes in the process of economic development: Modifications and extensions). *Ruch Prawniczy, Ekonomiczny i Socjologiczny*, 76(2).
- Winiiecki, J. (2015): forthcoming, *Shortcut or Piecemeal. Economic Development Strategies and Structural Change*. Budapest-New York: CEU Press.