Quality-based competitive advantage – challenges for new EU members

Anna Kaderabkova

14.1. Introduction

The paper presents challenges to the new EU members, including Poland, on the road to the quality-based competitiveness. The presentation has been divided into five parts. After a brief overview of currently used analytical approaches in the first part, the second assesses country positions on the road to knowledge-based EU economy in terms with the four key KAM pillars. More specifically, the cross-country differences are observed between innovation vs. education driven paths. The third part specifies the country positions in terms of key aspects of quality-based competitiveness, i.e. sources and extent of innovation activities, and completeness and sophistication of value added chain. The fourth part presents data on quality-based catch-up in terms of increasing shares of technology and skill intensive industries. The alternative analytical approaches have been presented in the fifth part, pointing to the actual skill intensities of economic activities, which remain low in the new EU members. Conclusions point to economic policy implications and challenges for the less developed EU members on their road to knowledge-based economy.

The principal condition for growing living standard lies in the long-run sustainable country competitiveness based on the competitiveness of its businesses. Long-run sustainability of economic growth and competitiveness must rely on technology and skill intensive activities, i.e. those with high innovation and education content (inputs and outputs). Such a competitive advantage is referred to as quality-based in contrast to the cost-based advantage relying on comparatively lower production cost (mostly due to undervalued exchange rates). Achieving quality-based competitive advantage (or successful transition to knowledge-based economy) is, understandably, much more difficult for less developed countries, including the new EU entrants and among them – Poland. Therefore, the cross-country differences in innovation and education performance within the enlarged EU may even increase in time. The new EU-members

(within EU-25) thus face double challenge – both of economic and technology catch-ups. Economic policy support, to be effective, must necessarily take into account country-specific characteristics of national innovation and education systems, and apply comprehensive approach with regard to all of the key system constituents.

More specifically, the above-mentioned qualitative factors of long-term sustainable growth and competitiveness must be viewed as mutually interlinked and dependent concerning both their supply/demand characteristics and effectiveness. *Resources and results of innovation performance* represent the main condition of the development of quality-based competitive advantage and quality (technology and skill) intensive economic activities. *Quality of human resources* is both the condition and the reflection of the level of innovation performance, particularly in relation to the supply of high and specialized skills and generally in relation to the adaptability of labour to the changing skill requirements. *Institutional quality of business environment* can be mostly viewed as a sort of enabling factor, as the principal condition for the development of quality-based activities requiring investment with a long-term and uncertain return, i.e. in innovation and human resources and infrastructure.

14.2. Overview of analytical approaches

Notwithstanding the importance of qualitative factors for long-term growth performance and competitiveness, they are both difficult to measure directly and, consequently, used for analytical purposes. It must be therefore appreciated, that a growing interest in the role of these factors is also reflected in further elaborating and harmonizing the measurement methodology of the related indicators and in widening their range. More sophisticated analytical approaches makes possible comparisons across time and countries, and thus the efficiency evaluation of implemented political measures, including suggestions on desirable changes in their focus and intensity. The following overview presents briefly the most important comparative analyses brought about recently in the key qualitative factors of competitiveness.

In the field of institutional quality, two projects of the *World Bank Institute* (WBI) can be considered as methodological and analytical contribution. *Governance matters* (Kaufmann *et al.*, 2003), based on aggregation of survey results included in six cluster indicators on various characteristics of institutional quality (*governance indicators*). More specifically, in the field of quality of business environment, WBI analyses comprehensively evaluate country *investment climate* (Batra *et al.*, 2003). Survey results on business environment quality are combined with performance characteristics (also *business performance*), which

reflects the shifting attention to microeconomic sources of competitiveness. The OECD's project *Sources of Growth* (OECD, 2003a) deals specifically with the level of regulation, approximated by the indicators of interference in partial markets. Long-term and comprehensive approach to the specific aspects of governance is expressed particularly by indices of economic freedom (published by the Fraser Institute, Heritage Foundation) and in relation to the progress of reforms in transition countries by the report "Nations in Transit" (published by Freedom House). Partial aspects of governance or business environment are included e.g. in the Corruption Perception Index (published by Transparency International) in cases of corruption, which are designed as result aggregations of partial surveys.[1] Alternative comprehensive approach to governance evaluation is represented by indicators of political risk, which are focused on the level of investment risk in host economies.[2]

In the field of innovation performance and human resource quality (within transition to knowledge-based economy), benchmarking publications can be considered as methodologically key results of current analytical activity. In the first place, it is the periodical OECD analysis – *Science, Technology and Industry Scoreboard* (OECD, 2003) with the stress on evaluation of knowledge-based activities of member countries. *Sources of Economic Growth* (OECD, 2003a) stressing the identification of long-term economic performance (including technology change and human capital quality). *National Innovation Systems* capture qualitative changes of organizational system of innovation activities, while *Science and Technology Outlook* (OECD, 2004a) is oriented on implications of transition to the knowledge-based economy on economic and political measures. In recent years, comprehensive analytic publications of individual directorates of the European Commission have been published. *European Innovation Scoreboard* (EC, 2004a) includes the indicators rating the preconditions of innovation performance and its results. *Enterprise Policy Scoreboard* (EC, 2004) specializes in qualitative conditions of productivity increase. A comprehensive evaluation of research and development activities is included in the publication *European Report on Science & Technology Indicators* (EC, 2003) with a very complex analysis of expenditures and human resources for research, innovation, science and technology.[3] More specifically in the field of human resource quality,

[1] See the respective web links: www.freetheworld.com/release.html, www.heritage.org/research/features/index/, www.freedomhouse.org/ratings/index.htm, www.freedomhouse.org/research/nattransit.htm

[2] See e.g. the regularly updated Country Risk Service (Economist Intelligence Unit) and International Country Risk Guide (Political Risk Services).

[3] The Eurostat carries out its own databases and specific surveys especially in the context of meeting the goals of the Lisbon strategy, whose part is constituted by knowledge-based economy indicators in science and technology. *Community Innovation Survey* assesses innovation activities of companies (Eurostat, 2004).

international comparisons are elaborated especially in periodic OECD publications. *Education at a Glance* (OECD, 2004) belongs to principal publications evaluating educational attainment of the population.

14.3. Knowledge assessment matrix

In terms of four key pillars of the Knowledge Assessment Methodology (KAM) applied by the World Bank, the driver of quality-based competitiveness is the innovation performance, as the key source of demand for knowledge inputs. Their supply is influenced particularly by education, i.e. increasing human resource quality. Innovative companies demand skilled human resources, and are motivated to the investment in their development. The combination of innovation performance and skilled human resources represents principal precondition for the development of knowledge-based competitiveness. The complementing role is played by the ICT infrastructure quality, and the quality of governance and business environment.

According to the summary ranking (tab. 1), within the EU,[4] roughly four country groups can be identified – the first group with the best results includes Scandinavian countries, the Netherlands, UK and Belgium. The new members rather fall behind. The best among them are Estonia and Hungary. With regard to the structure, one can differentiate between the countries, where the levels of the individual components are roughly similar, and the countries with more marked differences among them. These structural differences point to the problem characteristics, on which the related political measures should focus. Marked disproportions between the individual components of quality competitiveness impede its development.

At first, it is to be pointed to the very strong linkage between the individual components of qualitative competitiveness, which is indicated by pair correlations (Tab. 2). This linkage illustrates the comprehensiveness and mutual interconnection of the partial qualitative factors, with the implications for the adequate focus of the related political support.

Moreover, it is necessary to mention the specific relation between the components of innovation performance and human resource quality, which is differentiated according to the level of qualitative competitiveness (fig. 1). The countries with higher level of competitiveness show up smaller difference between two components or the higher levels of innovation performance. The countries with worse average position, on the contrary, differ more markedly.

[4] The values were produced by normalization of the original data within the country group with high Human Development Index (HDI > 0,8). The values range from 10 (the best score) to 0 (the worst score).

Table 1. Quality-based competitiveness and its components

	Gover-nance	**Inno-vation**	**Human resour.**	**ICT infr.**	***Ave-rage***
Sweden	7,0	7,9	7,5	8,7	*7,8*
Finland	7,5	8,3	7,3	7,7	*7,7*
Netherlands	7,2	7,6	7,1	7,2	*7,3*
Denmark	7,1	6,2	6,6	7,7	*6,9*
United Kingdom	5,7	7,0	5,6	7,4	*6,4*
Belgium	6,4	6,7	6,5	4,7	*6,1*
Austria	6,4	5,7	5,8	5,4	*5,8*
Denmark	5,7	6,5	5,1	5,7	*5,7*
Ireland	5,8	7,0	5,4	4,6	*5,7*
Spain	5,0	4,8	4,9	6,1	*5,2*
France	4,0	5,6	4,7	5,9	*5,1*
Hungary	3,9	5,0	4,7	4,6	*4,6*
Estonia	4,7	4,1	4,8	4,3	*4,5*
Czech Rep.	3,4	3,6	4,1	5,3	*4,1*
Portugal	4,7	3,5	4,0	3,9	*4,0*
Slovenia	3,6	4,4	3,8	4,3	*4,0*
Italy	3,1	3,3	4,0	4,3	*3,7*
Slovakia	2,8	3,4	3,3	3,6	*3,3*
Cyprus	3,8	2,2	3,3	3,4	*3,2*
Greece	2,7	2,5	3,5	3,7	*3,1*
Latvia	3,1	2,2	3,5	3,1	*3,0*
Lithuania	3,0	2,6	3,1	2,1	*2,7*
Poland	**1,8**	**2,5**	**3,6**	**2,3**	***2,5***

Source: KAM (2004), own calculations.

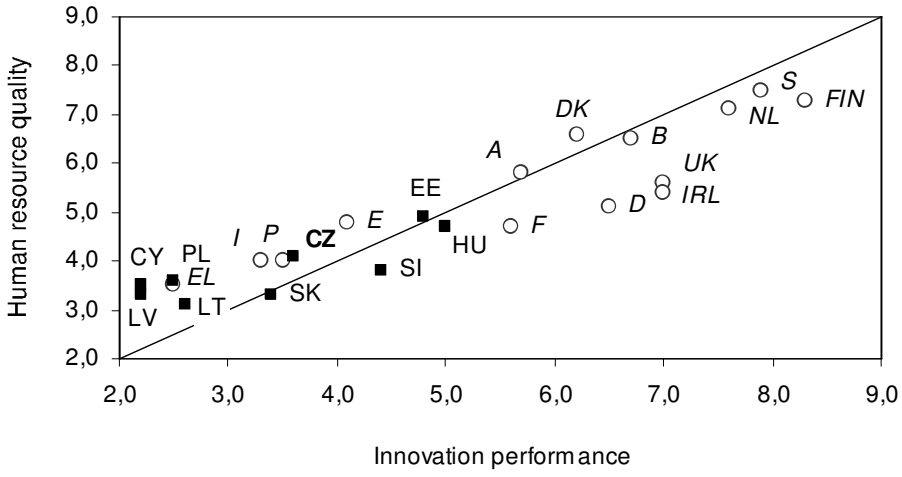
Table 2. Pair correlations of quality-based competitiveness

	Gover-nance	**Inno-vation**	**Human resources**	**ICT infrastr.**
Governance	1			
Innovation	0,898379	1		
Human res.	0,939751	0,930377	1	
ICT infrastr.	0,824792	0,853248	0,869781	1

Source: as in table 1.

The new members also share very low level of governance, particularly as compared to the level of ICT infrastructure. The presented disproportions require a change of economic policy not only to lessen the overall falling behind, but also to lessen the indicated mismatches.

Figure 1. Innovation performance and human resource quality



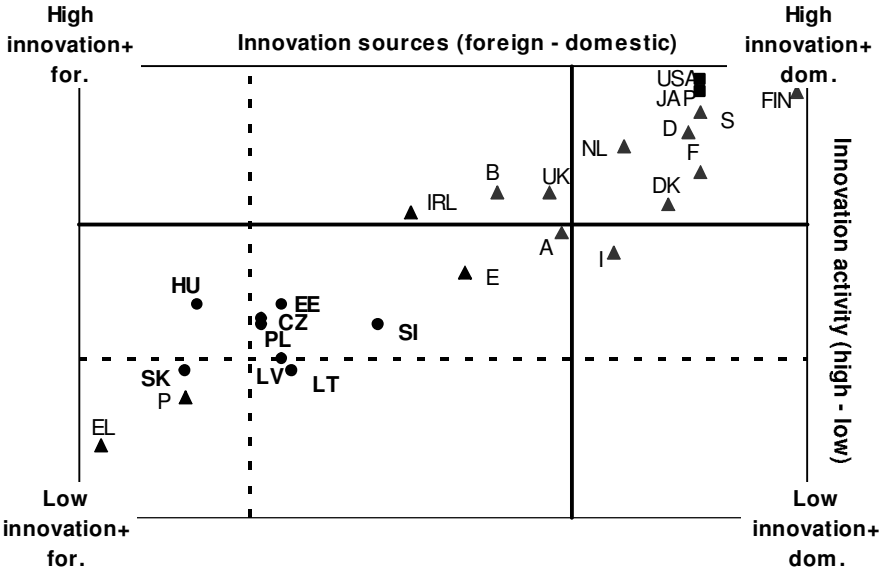
Source: as in the table 1.

14.4. Competitive advantage matrix

Competitive advantage matrix defines country positions in terms of the prevailing source of technology knowledge and source of competitiveness. Two pairs of indicators define the country positions. The first pair (fig. 2) includes the extent of own innovation activity (determined by business R&D expenditure and absorption capacity for new technology), and source of innovation output (domestic knowledge base or transfer, imitation, licence purchases from abroad).

The new EU-members show quite much falling behind, i.e. their innovation activity is much lower and dependence on foreign technology knowledge – higher. Although one can hardly expect a marked leap of transition countries toward innovation quadrant (i.e. with a more important role of domestic innovation sources), more intensive development of their own innovation activity would be much desirable, as it also makes the technology transfer from external sources easier (i.e. toward the positions of Spain, Austria, Ireland).

Figure 2. Innovation intensity and innovation sources

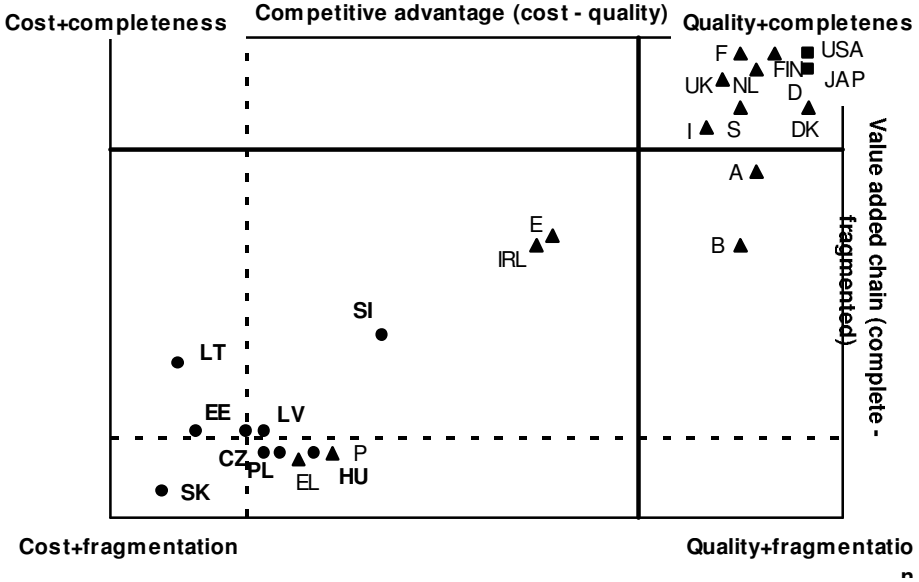


Source: WEF (2002), own modifications.

The related issue is the role of foreign direct investment, as the source of new technology in host countries, and the position of domestic branches of multinationals in value added chain.

The second pair of competitive advantage matrix (fig. 3) outlines the country positions in terms of the source of competitiveness at international markets (low production cost or quality intensive specific assets and unique products and processes), and in terms of the completeness of (multinational) value added chain, i.e. if it comprises the quality intensive and strategically important segments, or it is fragmented in favour of the qualitatively inferior activities. The second case is typical for the less developed host economy, when technology and skill intensive segments remain located in the home country. Within EU-25, the positions of the new members are again quite unfavourable. The competitive advantage is assessed mostly as cost-based, and the value chain as fragmented (i.e. limited rather to production activities in narrow sense, without product development, distribution and marketing, with products sold at international markets under foreign trade marks).

Figure 3. Source of competitive advantage and completeness of value added chain



Source: as in the figure 2.

14.5. Technology and skill catch-ups

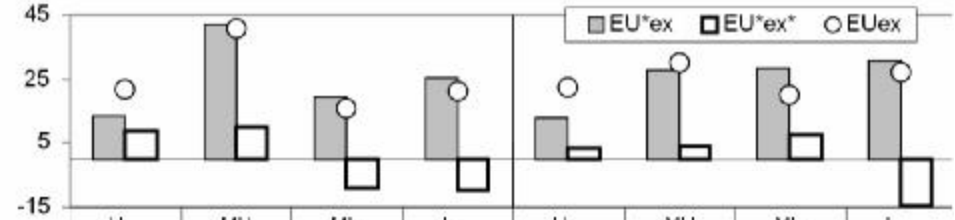
To characterize quality-based specialization of the new EU-members, criteria of technology and skill intensities are applied.[5] However, it is to emphasize that the respective industry classifications were drawn up on the characteristics of the manufacturing industries assuming a complete production chain, i.e. including technology and skill intensive segments. Therefore the resultant values should be interpreted with caution in case of export structure of the transition countries, as the technology and skill contents of their economic activities in fact remain lower than in developed countries. Basically, the advance of export structure to the higher shares of industries classified as technology and/or skill more intensive can be viewed as a positive characteristic. Whether the transition economies will succeed in attracting qualitatively more intensive segments of these indus-

[5] The classification according to technology intensity is based on OECD methodology (2002) that divides industries on the basis of their R&D intensity into four groups designated as high (H), medium-high (MH), medium-low (ML) and low (L) technology intensive.

tries within global value added chain, remains the question of further development.

The comparison of manufacturing export structure in terms of technology and skill intensities[6] between the old and the new EU-members (fig. 4) shows the prevailing shares of industries with medium-high technology and low skill intensities in transition countries in 2001. As compared to 1995, the most marked increase was in the share of industries with medium-high technology and medium-low skill intensities.

Figure 4. Shares of industry groups in the exports to the EU, 2001 (%), and their changes, 1995-2001 (p.p.)



EU*ex	13,5	42,0	19,4	25,1	13,1	27,5	28,5	30,6
EU*ex*	6,7	9,7	-6,8	-9,5	3,4	3,8	7,4	-14,7
EUex	22,0	40,7	16,1	21,3	22,6	30,1	20,3	27,0

Note: EU*ex – shares in manufacturing exports of the new EU-members, EU*ex* – changes in the shares, EUex – shares in manufacturing exports of the old EU-members.
Source: Own calculations from Eurostat (2003).

As compared to the export structure of EU-15, the group of new members still shows up higher shares of industries with low and medium-low technology intensity, and low share of those with high technology intensity. However, the share of medium-high technology intensive industries already exceeds the value in EU-15. In case of skill intensity, the position of the new EU-members is less favourable. The shares of the more skill intensive industries fall behind the values in EU-15, as compared to the dominance of the less skill intensive industries.

[6] The main source of data for the empirical analysis of structural changes in manufacturing exports is the foreign trade database COMEXT (2002) comprising data on the internal and external trade of EU member countries (*intra-extra EU trade*) since 1988. Only the trade reported for the EU-15 aggregate is included in the analysis, where partners are also the new EU-members. The trade of the monitored countries with the rest of the world is not included.

14.6. Qualitative structure of employment

The quality structure of the employed in acceding transition countries is assessed according to skill intensity of performed occupations. The qualitative structure of the employed is described in terms of ISCO groups, based on data from labour force surveys carried out by national statistical offices.[7] The characteristics of the qualitative structure of employment in manufacturing are specified according to the technology intensity of industries.[8] The specification is to show whether the differences in technology intensity are reflected in qualitative differences of employment structure. When the skill intensity differences between the technology based industry groups are low, the actual quality intensity of these groups is low, reflecting their assembly operation nature.

As to the skill intensity of occupations employment structure in technology differentiated industry groups (fig. 5), the qualitative characteristics of workers in high technology industries are still unfavourable in transition countries as compared to EU-15. As for non-manual workers, their share in transition countries is markedly lower (by 26 p.p.) in HT industries compared to EU-15, and their share is also considerably lower in the other industry groups. The workers in low skill occupations (L) account for almost 40% in HT industries in transition countries, which is even the highest value of all industry groups; the share of workers in high skill occupations (H) is markedly lower (by 20 p.p.) than in EU-15. The share of employees in medium skill occupations (M) is in the new EU-members on a similar level like in EU-15 but the percentage of the blue-collars is much higher (this characteristic is also true of other industry groups).

In medium-high technology industries (MHT) the qualitative structure of employment in transition countries is slightly better thanks to the share of workers in medium skill occupations that is on a similar level like in EU-15.

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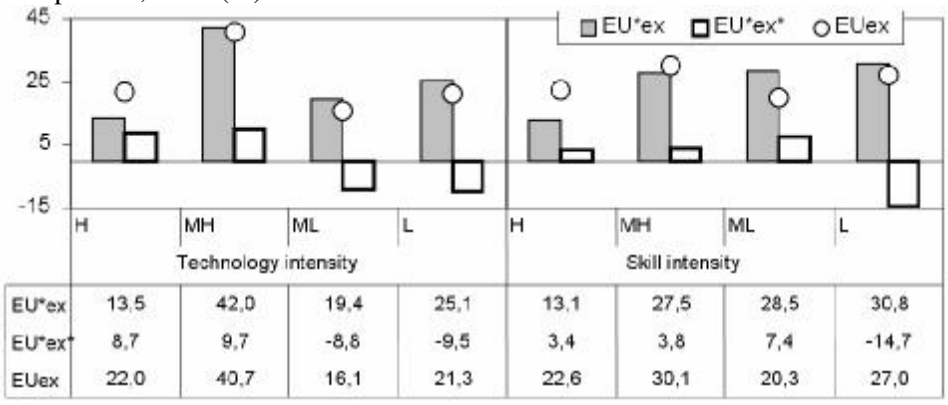
[7] ISCO-88 (*International Standard Classification of Occupations*) distinguishes 10 groups of occupations (0 to 9), again divided into three (qualitatively differentiated) groups: low (ISCO 8-9: plant and machine operators and assemblers, elementary occupations), medium (ISCO 4-7: clerks, service workers and shop and market sales workers, skilled agricultural and fishery workers, craft and related trades workers) and high (ISCO 1-3: legislators, senior officials and managers, professionals, technicians and associate professionals). Besides, two groups of workers are differentiated: non-manual (ISCO 1-5) and manual (ISCO 6-9).

[8] The industry classification according to technology intensity is made on a two-digit level of NACE, which is less precise than the above used OECD classification. This modification is necessary because the data on employment on a three-digit level of NACE are not available in some countries. Modified classification of industries according to technology intensity in terms of NACE codes is as follows: high technology (HT) - 30, 32, 33, medium-high technology (MHT) - 24, 29, 31, 34, 35, medium-low technology (MLT) - 23, 25-28, low technology (LT) - 15-22, 36.

Figure 5. Employment structure in manufacturing according to skill intensity of occupations, 2001 (%)



	Technology intensity				Skill intensity			
	H	MH	ML	L	H	MH	ML	L
EU*ex	13,5	42,0	19,4	25,1	13,1	27,5	28,5	30,8
EU*ex*	8,7	9,7	-8,6	-9,5	3,4	3,8	7,4	-14,7
EUex	22.0	40,7	16,1	21,3	22,6	30,1	20,3	27,0

Note: Groups of occupations: H – ISCO 1-3, M – ISCO 4-7, ML – ISCO 6-7, L – ISCO 8-9. Technology intensity: HT – high, MHT – medium-high, MLT – medium-low, LT – low. NMAN – non-manual workers. EU – old member countries, EU* - new member countries. The values for EU* are without Poland.
Source: Own calculations from Eurostat (2003).

However, the share of workers in high skill occupations is lower than in EU-15, while that in low skill occupations – higher. The characteristics of the qualitative structure of employment in MLT and LT industries are very similar in the new EU-members, and in all groups of occupations, they are either worse or only slightly better than the EU-15 average.

14.7. Conclusions

In the context of accession to the EU, and the transition to knowledge-based economy, as envisaged by Lisbon strategy goals, the new members, aspiring to overcome the GDP per capita gaps, face a **double challenge**: economic and technology (or in the present concept knowledge) catch-ups. The sources of existing competitive advantage (especially low production costs) in the new EU members are gradually disappearing. The outlook of development of qualitatively new resources, however, is still limited due to prevailing economic and technology backwardness. Systemic policy support certainly is necessary to stimulate the desirable economic and technology catch-ups. At the same time, country-specific nature of qualitative characteristics of growth performance and

competitiveness prevents universally valid recipes from being applied or at least reduces their efficiency.

As to the institutional quality, indicators of governance quality in the new EU-members show that it is falling behind in a long-term or even its position is worsening. These processes directly and unfavourably influence also the perception of business environment quality and investment climate on the side of economic agents. Consequently, the underdeveloped institutional quality increases the risks and costs of economic decisions, and hinders an adequate development of quality-based activities with a long-term, or uncertain benefits.

As to the innovation performance, a sustaining falling behind shows up in the low level of own innovation capabilities. Despite increasing shares of so called technology and skill intensive industries, the actual technology intensity of economic activities remains low (in terms of R&D expenditure share in value added) as well as the skill intensity (in terms of high-skill occupation share, so called white-collars, in employment). Within the (fragmented) global value chain, mostly the qualitatively less intensive segments prevail in the FDI companies. The potential of technology transfer remains underused due to the underdevelopment of domestic knowledge base. National innovation systems are underdeveloped and inefficient, according to both the results of company innovation surveys, and the number of international patents.

As to the human resource quality, in particular, a marked falling behind in the supply of high, or specialized skills shows up. When such skills are available, the danger of brain drain increases due to the low R&D intensity of economic activities. Prevalence of assembly operation segments in FDI manufacturing and underdevelopment of the more sophisticated business services distorts the demand toward the less skilled occupations. As to the preconditions for the transition to knowledge-based economy and adjustment capacity to changing skill requirements, the problem must be seen also in the low participation in continuing vocational training (life-long learning) and skill-improvement within working life.

Effective political support for changing this state, in the first place, must take into account the development-specific nature of competitiveness and its sources in the new EU-members. Consequently, the qualitative upgrading and modernization in transition countries require not only sufficient fiscal resources, but, in the first place, increasing efficiency of the supporting system, particularly in terms of its comprehensiveness and long-term orientation, stress being put on incentives adequately motivating the individual economic agents, and, last but not least, balancing supply and demand oriented stimuli measures. Within such framework, with regard to the linkages between the key qualitative factors of long-term competitiveness, higher expenditure on education and R&D, as required by Lisbon strategy goals, must be matched with the support to innovative

demand for skilled workforce, and to increasing quality of institutional environment. Despite the prevailing dependence on foreign technology, the ability of domestic production factors must be increased to supply specific assets for the development of domestic knowledge-intensive activities and for maximization of the benefit of FDI technology transfer.

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