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# Global value chains and middle-income trap in the Central and Eastern Europe: policy implications

Policy brief

Vilnius

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Technology transfer via global value chains (GVCs) has been discussed as an indispensable mechanism of upgrading in less developed countries/regions. Participation and upgrading in the GVCs is thus seen as a driver of overcoming the 'regional innovation paradox' (Oughton, Landabaso & Morgan, 2002) and the 'middle-income trap' that Central and Eastern European (CEE) region is facing. However, merely joining the GVC does not guarantee upgrading, and an economy might still be stuck in low value activities. So called 'high-road development' can be pursued, provided that firms and clusters focus on innovation, as well as functional, chain and inter-sectoral upgrading (Parrilli & Blažek, 2018). **The relevant question that we want to explore in this policy brief** focuses on the practical approach taken to facilitate the 'high-road' of GVC upgrading, i.e. what role can policies play in exploiting GVCs as leverage mechanisms for learning and knowledge-based growth?

The broader research question is as follows – how can participation and upgrading in GVCs help countries become more innovative and escape the middle-income trap? Our key proposition is that innovation activities of firms depend on their positions in GVCs and competences of employees, determining absorptive capacities of companies. Firms involved at the beginning or the end of GVCs (in other words, high value functions) have opportunities and incentives to innovate, and their employees are constantly learning at the workplace, which further increases innovation potential. Meanwhile, firms creating low value-added in GVCs (despite subsidies for innovation or training) do not have incentives to invest in risky innovations, and their employees eventually lose competences.

The data collection has been part of the 'Middle-income trap: global value chains, skills and innovations in CEE countries' project, funded by the Research Council of Lithuania. It produced six research papers:

- Contributed to theoretical understanding of GVCs and middle-income trap by developing a conceptual model for explaining the relationship between firms' positions in GVCs, innovativeness and employees' skills (Krūminas, Paliokaitė, Martinaitis & Tiits, 2019).
- Quantitatively analysed firms' positions in GVCs in CEE countries at sectoral level. This involves analysis of international input-output tables covering 2000-2014 (Rybakovas, Krūminas & Paliokaitė, 2019).
- Estimated factual competences of employees. This involved development a new measurement based on types of tasks that employees carry out at the workplace, indicating the actual use of their skills (Martinaitis, Christenko & Antanavičius, 2019).
- Empirically estimated relationships between position in GVCs, skills, and innovativeness at sectoral level by employing path analysis and moderation modelling (Krūminas, Rybakovas & Paliokaitė, 2019).
- Identified the 'success factors' of knowledge-based growth via comparative analysis of four successful upgrading case studies in Lithuania - 'Thermofisher Scientific', 'BOD Group', 'Devbridge Group' and 'Robotic process automation initiative' introduced by Invest Lithuania for the global business centres (GBS) (Paliokaitė, Jašinskaitė & Tiits, 2019).
- Proposed policy recommendations that could contribute to developing upgrading strategies for escaping the middle-income trap (Paliokaitė, 2019).

Research findings were presented at five academic conferences. Policy implications were discussed with decision makers from all three Baltic States, the European Commission (DG REGIO) and the OECD at the seminar 'Smart specialisation strategy as a tool to better anchor Baltic States in global value chains' that took place in Riga, Latvia on 19<sup>th</sup> of September 2019.

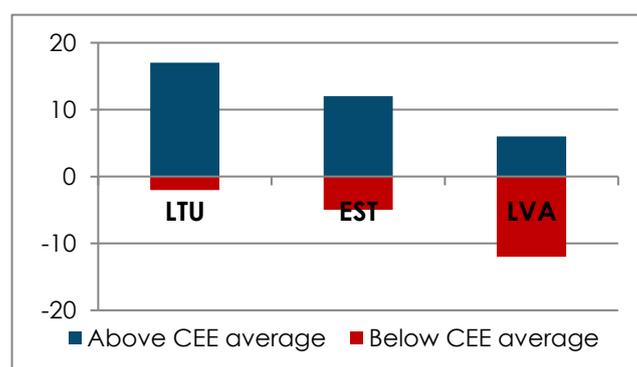
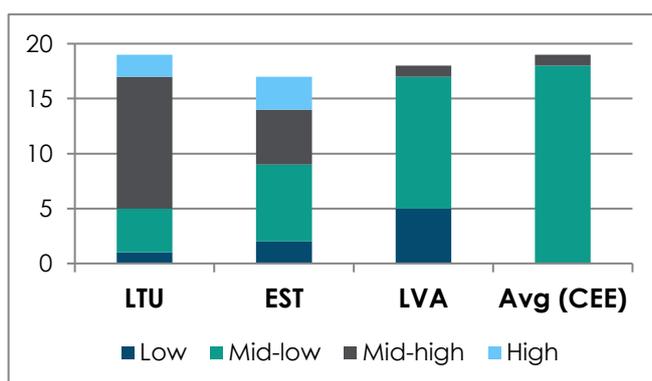
Further discussion is presented as follows. First, we discuss some critical evidence on the GVC participation productivity and the relationships between GVC participation, skills, and innovation in the CEE. Our literature review provides a synthesis of knowledge available on upgrading strategies and drivers, and derives a tentative comparative framework of different upgrading strategies and relevant policies (see 'Policy toolbox for GVC upgrading'). We round the policy brief with key implications for policy.

Policy recommendations provided in this brief are primarily aimed at decision makers in the Baltic States. However, we believe that this discussion and the proposed tentative framework could apply to other 'catching-up', 'developing' and 'emerging' economies facing similar challenges, which includes most of CEE countries.

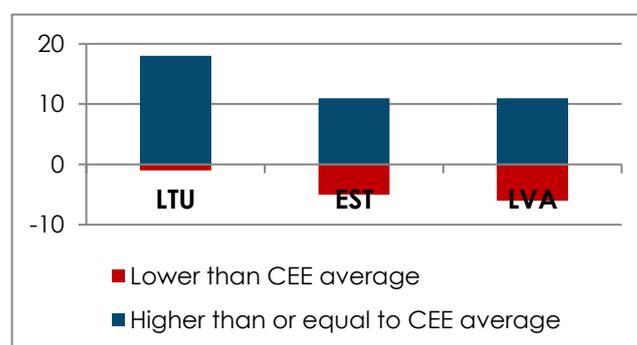
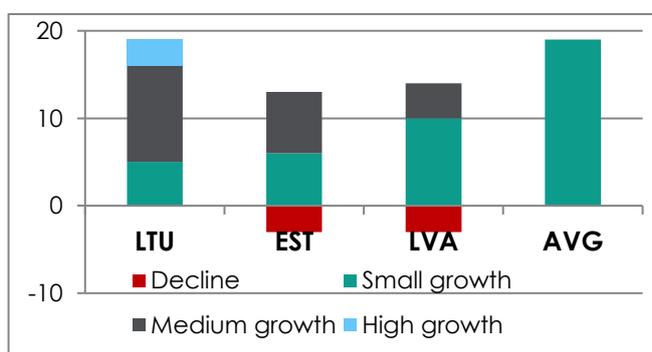
## GVC PARTICIPATION, SKILLS AND INNOVATIONS IN CEE

- First, to test the positions of GVC participation, we evaluate **forward GVCs participation productivity** in the manufacturing industry sectors of the Baltic States. GVCs participation productivity-based sector's indexing and positioning reveals the efficiency of considered business in terms of GVCs orientation and respective incomes sourced in GVCs. GVCs participation productivity indicator is measured as the ratio between domestic value added (VA) in intermediary products in a country-sector and the number of persons engaged in the sector, giving VA in intermediary products per person engaged. Analysis is based on World Input-Output Database (WIOD) data for 2000-2014 (Timmer, Dietzenbacher, Los, Stehrer & de Vries, 2015), which covers 43 countries (for global ranking) and 56 sectors (19 manufacturing sectors were included). To produce a global position ranking, country-sectors are ranked based on the VA in intermediary products per person engaged in the sector, assigning them a number. Based on country-sector ranking, position index is then bounded between 0 (lowest VA in intermediary products per person engaged) and 1 (highest VA in intermediary products per person engaged) for each studied country-sector, obtaining their relative global ranked positions.
- The measure calculated as value added exported with intermediate products per one person engaged in the sector is worth and useful when used to compare, and index same sector participants from different countries. Economic, i.e. measurement based on income or exported value added, background and global context relevance are the main advantages of forward GVCs participation productivity measurement compared to more traditional GVCs participation ratio and GVCs position calculated as average number of chain segments backwards before considered country-sector and forward after it up to final consumer ratio.

Figures 1-2. GVC productivity ranking 2014



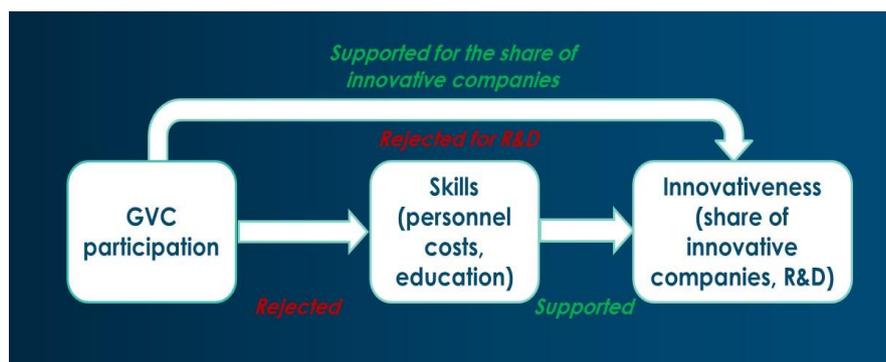
Figures 3-4. Ranking change 2000- 2014



- Does it mean that GVC-based growth is already knowledge-based? Not necessarily. It could simply show that the manufacturing sector has increased the scale of production by focusing on external markets vs internal markets over the analysed period. If GVC participation actually leads to knowledge-based growth, our key hypothesis should be supported, and higher GVC participation should have a statistically significant positive relationship to higher innovativeness and higher employee skills (see Figure 5 below). In order **to test our proposition, we use panel data analysis with indicators of CEE countries' involvement in GVCs, skills, and innovativeness** from the World Input-Output Database (Timmer et al., 2015), UIBE GVC Index and Eurostat for 2008-2014. To validate research findings, we compare the analysis of the CEE region with findings on Western Europe (WE). Key variables:

- o GVC participation measured as the ratio between domestic VA in intermediary products and total domestic VA for a country-sector (UIBE GVC, WIOD)
- o Innovativeness measured using four indicators: share of innovative enterprises, in-house R&D as share in total turnover, external R&D as share in total turnover of a country-sector, share of enterprises in any type of innovation co-operation with a partner in EU, EFTA or EU candidates (including national partners) out of product/process innovative enterprises
- o To measure skills of employees, we use two proxy indicators: a) average personnel cost per employee at country-sector – serves as a proxy variable for skills actually used at a workplace, since it covers remuneration for employees (crudely assuming that wages reflect the actual skills, as highly skilled workers would move to other sectors if their wages do not meet their skills); and b) data on enterprises with more than 75% of employees with university education out of innovative enterprises in a country-sector – allows to assess the educational attainment level in innovative firms (assuming that it is higher in innovative compared to non-innovative firms).

**Figure 5. GVC participation, skills and innovations – stylised model and key findings**



- The results show that **so far involvement in GVCs does not clearly show positive link with innovation in CEE countries.** Participation in the GVCs does not have a positive relationship with inhouse or external R&D nor with employee skills, although this relationship is found in the WE sample – participation in GVCs is positively related to personnel

cost in the WE sample. Thus, it is likely that firms in CEE countries have entered GVCs initially after the end of the Cold War by providing cheap low-skilled labour required by multinational corporations to carry out mid-chain tasks, such as assembly. Low labour costs and geographic position could give CEE firms an advantage to outcompete other destinations for low value-added GVC activities. Therefore, such involvement might be accompanied by some knowledge spillovers, acquisition of new machinery, or adopting (mostly already existing) innovations that improve firm activities.

- However, **participation in GVCs is positively related to the share of innovative companies**, likely due to the spillovers of process, organisational and related innovations. The positive link between participation in GVCs and the share of innovative firms at the country-sector level likely emerges due to the diffusion of knowledge in GVCs. Even if a participating firm enters a GVC at its mid-section and does not carry out R&D activities, it can copy some of the practices of its fellow participants of the chain or be pressed to adopt new marketing, process, or related non-product innovations, in order to meet the standards set for participation in the chain. However, the higher the average personnel cost per employee, the lower this effect is. This may be explained by higher-skilled country-sectors already being more advanced in terms of innovation, therefore, they are less affected by participation in GVCs (i.e. the introduction of GVCs-based innovations in firms, which already innovate does not affect the value of the variable). Therefore, the effect of participation in GVCs on the share of innovative firms can be stronger at the lower level of skills.
- Importantly, we find that the level of skills in the sector plays an important role in determining the relationship between participation in GVCs and innovation, which may serve as a foundation for identifying actions on how positive effects of GVCs could be used effectively. First, **higher skills are associated with higher innovativeness** – the findings are mostly consistent with the hypothesis in both CEE and WE samples. Furthermore, participation in GVCs also seems to have a negative effect on innovation cooperation, but the effect can become positive with a higher level of skills. Therefore, we expect that the effect of GVCs differs based on the level of skills in the sector – on the one hand, if a country-sector is on average more highly skilled, its GVCs participation is likely to be associated with better innovation performance. On the other hand, if a country-sector has a relatively low-skilled workforce, its GVCs involvement would likely increase its innovativeness to a lower extent (though we still expect the relationship to remain positive). In other words, we hypothesise that skills can be seen as a moderating variable between GVCs and innovation. However, the current analysis showed a lack of support for such positive moderation.

## POLICY TOOLBOX FOR GVC UPGRADING

By reviewing the literature and investigating case studies of successful upgrading we propose a tentative policy framework (see Table 1 below). Following Havas (2015) and Paliokaitė (2019), it highlights the diversity of GVC upgrading trajectories and relevant incentives, offering potential insights for policy-makers interested to support upgrading through tailored and selective policies, rather than a one-size-fits-all approach.

**Table 1. Strategic framework for facilitating GVC participation and upgrading**

Routes	Strategies	MNEs' investment drivers	Policy options
1. FDI based: Entering existing GVCs (first step to upgrading)	Facilitating domestic firms' entry into GVCs (expanding scale of production)	Market and cost-seeking behaviour: <ul style="list-style-type: none"> <li>• Business agglomeration and location-based advantages, esp. geographical and cultural proximity.</li> <li>• Market competition and the evolution of business strategy.</li> <li>• Abundant presence of labour and other productive resources at relatively low cost.</li> <li>• Proactive FDI policy and incentives.</li> </ul>	Creating <b>world-class climate</b> for foreign tangible and intangible assets: <ul style="list-style-type: none"> <li>• Ensuring cost competitiveness.</li> <li>• Improving drivers of investment.</li> <li>• Organising domestic value chains and improving quality of infrastructure and services.</li> </ul>
	<b>Attracting high-value FDI</b>	Knowledge and technology-seeking behaviour: <ul style="list-style-type: none"> <li>• Availability of public incentives and presence of pro-active FDI policies linked to industrial policy.</li> <li>• Access to an increasing large pool of science and engineering talent.</li> <li>• Large presence of strong research infrastructures.</li> <li>• Availability of strong clusters, networks of suppliers that can meet the MNEs quality and delivery standards. MNEs often invest in existing consolidated clusters, but not in their development phase.</li> <li>• Technology seeking motives, incl. mergers and acquisitions.</li> </ul>	Creating <b>world-class GVC linkages</b> : <ul style="list-style-type: none"> <li>• Proactive FDI policy and incentives.</li> <li>• Attracting the 'right' foreign investors.</li> <li>• Jump starting GVC entry through creation of EPZs.</li> <li>• Helping domestic firms find the 'right' trade partners abroad.</li> <li>• Strengthening GVC-local economy linkages on the buyers' and sellers' sides</li> <li>• Improving connectivity to international markets.</li> <li>• Improving links and incentives for diaspora.</li> </ul>
2. Upgrading existing GVC participation to higher-value activities	<b>Promoting economic upgrading and diversification, esp. functional and intersectoral upgrading</b>	Efficiency and productivity seeking: <ul style="list-style-type: none"> <li>• Streamlining the supply base and subsequent 'cascade effect'.</li> <li>• Proactive internationalization strategies.</li> <li>• Availability of research infrastructures, policies, public incentives</li> <li>• Regulatory support of the national government (smart specialisation).</li> </ul>	Strengthening absorptive capacity and <b>building world-class innovation system</b> : <ul style="list-style-type: none"> <li>• Investments in R&amp;D infrastructure.</li> <li>• World-class talent production with relevant skills in relevant science and education fields.</li> <li>• R&amp;D and innovation policies.</li> <li>• Clusterisation and knowledge transfer policies.</li> <li>• Complying with process and products standards.</li> <li>• Access to markets (technology bridges).</li> <li>• Developing workforce skills and incentives for lifelong learning.</li> </ul>
3. Build new value chains	<b>Strategic decoupling and re耦pling</b>		
	<b>Facilitate (disruptive) innovation and 'born globals'</b>		

Source: own elaboration, based on Tagliani and Winkler (2016), Belussi, Caloffi and Sedita (2017).

Main policy implications are discussed below.

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### To facilitate a move from lower- to higher-value added activities in the GVCs, three major policy routes are relevant.

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- **FDI-based growth** assumes targeting specialised higher-value niches in the GVCs suited to existing production and technological capabilities, and thus increasing GVC densification (the number of domestic firms participating in GVC). Possibly the most effective route for fast productivity growth in short term - it guarantees quick access to both the market and knowledge required for upgrading. Nevertheless, can also become a potential structural weakness in a long term.
- **Facilitate intersectoral and functional GVC upgrading** - moving to the more valuable stages, seeking more control and power in GVC. In the GVC literature there is a well-established four-fold typology of upgrading options (Humphrey and Schmitz, 2002). *Process upgrading* refers to transforming inputs into outputs more efficiently by reorganizing the production system. *Product upgrading* means moving into higher value-added product lines. *Niche or intersectoral upgrading* means applying the competence acquired in a particular function to move into a new sector. *Functional upgrading* - the most desirable type of upgrading within a GVC – refers to acquiring new, superior functions in the chain.
- **Building new value chains and new multinational enterprises** (MNEs, 'born globals') - a risky and painful road that requires many investments. Slow productivity growth should be expected in short term, but structurally potentially more advantageous situation in the future. *Strategic decoupling and subsequent recoupling* represents the 'in-out-in-again' hypothesis in which at the initial stage of growth, more participation in the GVC is desirable to learn from the outside, that functional upgrading at the middle stage requires some effort or stages of seeking separation and independence from existing foreign-dominated GVCs, and that at the advanced stage, firms and economies might have to seek further opening to integrate back into the GVC after establishing their own local value chains.

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### Coordinated policies able to support and promote the co-evolution of regional innovation systems (RIS) and GVCs are strongly needed in the CEE.

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- Modern industrial policies should include innovation, skills, GVCs and FDI policies. This requires a holistic approach to mutually reinforce and create synergies. These policies should identify potential development paths that recognize and enable transformations to industry specialisations, facilitate internationalisation, and strengthen external connections, including across different knowledge networks worldwide, targeting specialised high-value niches in the GVCs and sustaining local firms' insertion in GVCs. Proximity to advanced EU and US markets is one of the key success factors for internationalisation of endogenous SMEs and facilitation of own 'born globals'. Providing 'technology bridges' type policies and support for export across the sectors are thus especially relevant.
- Coupling of own R&D effort with the inward and international technology transfer requires de facto merging R&D/innovation policy and FDI/GVC policy not only at the national levels. Radosevic (2018) proposed establishing European GVC oriented industrial innovation policy as a way to assist technology upgrading of less developed regions such as CEE. This would require close collaboration between regions and EU and national authorities and expansion and modification of INTERREG type of programs and activities. It is in the interest of CEE countries to facilitate participation of local champions in the EU strategic value chains, via such instruments as Horizon 2020 / Horizon Europe, or Interregional innovation investments (future Interreg component 5).

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### Building endogenous absorptive capacity is needed before linking up – to create champions who command their positions in the GVCs and to capture most value from GVC participation.

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- Absorptive capacity is a bridging concept between GVC upgrading and knowledge-based growth. First, higher-value investors pursue knowledge and technology-seeking strategy. Second, our successful upgrading case studies show, confirming previous findings in literature, that building endogenous technological capability - investments into clusters and R&D capacities – are needed before linking up, in order to attract higher-value FDI and facilitate upgrading (especially functional upgrading). Public support encouraged local champions to take more risks when exploiting technological development opportunities.
- Concurrent with the effort of achieving various forms of upgrading, and particularly functional and inter-sectoral upgrading, policy efforts should target RIS so as to make it more effective in the delivery of relevant innovation outputs and building own value chains, leading to the presence of home-grown MNEs and of strong technological and production capabilities at the local level. Tiits and Kalvet (2013) suggested that 'intelligent piggybacking' strategies should be pursued by small open

economies like the Baltics, by anticipating disruptions in GVCs caused by technology, restructuring and upgrading existing technological and production capabilities with greatest potential for future growth, and preparing key skills and competencies to sustain or occupy viable positions in GVCs in the event of a disruption.

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**Human capital is the most critical asset to trigger upgrading. Efforts for linking up combined with cross-cutting policies and systemic measures in the field of education and labour-force training.**

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- Our research found evidence that higher skills are positively related to innovation at the sector level in both CEE and WE samples (Krūminas, Rybakovas, Paliokaitė, 2019). Participation in GVCs also seems to have a negative link with innovation cooperation, but the relationship can become positive with a higher level of skills. Access to science and engineering talent and qualified labour force in general is among the main motivations to invest in case of FDI-based growth. All interviewed companies stressed that further incentives needed to strengthen education (university and college or vocational) relevance for market needs.
- This implies that CEE countries should actively foster the quality of education, e.g. through competitive funding and attractive career and organizational structures in open academic labour markets. Given the key role of RIS' in the modern globalized economy, efforts targeting individual companies could be combined with cross-cutting policies and systemic measures in the field of education and labour-force training. Two challenges particularly relevant for the Baltic states are: a) structuring effect of smart specialisation strategies on university curricula – the process is too slow; and b) training of engineers and producing ICT graduates.

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**To capture opening positions in the GVCs national policies should create conditions for experimentation and enable 'public entrepreneurs'.**

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- Radosevic (2018) proposed introduction into innovation policy like smart specialisation of 'action learning' principles and of 'learning networks' as a governance mechanism. When applied to the innovation policy this form of experimentalist governance rests on four principles. First, policy goals are established in interaction with the affected stakeholders. Second, stakeholders have a significant degree of autonomy in pursuing different programs or projects. Third, their performance is monitored through the system of 'diagnostic monitoring' which discovers unforeseen events in the portfolio of projects and which tries to correct them or use as new opportunities rather than through ex-post evaluations on a project-by-project basis. Fourth, the goals, metrics, and decision-making procedures are reviewed in light of new problems and possibilities. In such 'experimentalist governance', learning takes place in the process of the application during which capabilities are upgraded, and policy design adapts.
- For the Baltic states, this implies more experimental and more inclusive approach to policy making (more entrepreneurial discovery), and more importantly - institutional conditions for experimentation in addition to annual multi-year programming. The case study of Robotic process automation initiative is a great example of how countries can be proactive in targeting higher-value niches opening up in the GVCs. It also shows that public entrepreneurs, acting in enabling way, are crucial to start triple helix collaboration initiatives with MNEs.

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