Central Europe's changing role in European manufacturing: Selective upgrading and rethinking the core–periphery divide

Közép-Európa változó szerepe az európai feldolgozóiparban: szelektív feljebb lépés és a centrum–periféria felosztás újragondolása

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ABSTRACT: Over the last two decades, Central Europe (CE) – comprising Poland, Czechia, Slovakia, Hungary, Romania and Slovenia – has become one of the most important manufacturing regions in the European Union. Existing interpretations have predominantly explained this transformation through concepts such as dependent development, integrated periphery, semi-periphery or factory economy, emphasizing the dominant role of foreign direct investments, external corporate control and integration into transnational production networks. While these perspectives continue to capture important features of the region's development, they increasingly underestimate the differentiated and evolving nature of CE's position within a changing European manufacturing system. This paper argues that CE should be viewed not as a static manufacturing periphery but as a region undergoing selective and uneven repositioning within the European division of labour.

The analysis combines Eurostat data, JETRO surveys of Japanese-affiliated firms operating in Europe, and firm-level evidence collected in previous research projects. We propose a distinction between three dimensions of core–periphery relations including market, network and functional perspectives.

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The findings demonstrate that CE has substantially strengthened its position within European manufacturing. The region's share in EU manufacturing output increased significantly, with particularly strong gains in automotive production, electrical equipment, furniture, rubber and plastics, and machinery-related industries. This growth has been driven primarily by productivity improvements and export expansion rather than by employment growth. At the same time, the region displays considerable internal diversity in terms of industrial structure, foreign ownership, innovation capabilities and levels of economic diversification. Evidence from JETRO surveys suggests that CE is increasingly perceived as both a major production platform and an important market, indicating movement towards the European market and network cores. However, progress towards the functional core remains much more limited, as headquarters and high-level R&D functions continue to be concentrated in Western Europe.

The paper identifies a changing set of endogenous and exogenous development determinants. Rising labour costs, demographic constraints, energy security, infrastructure quality, digitalisation, and institutional capacity increasingly shape regional development. Simultaneously, geopolitical restructuring, nearshoring, supply-chain regionalisation, and expanding EU regulatory frameworks are altering the conditions. Particular attention is devoted to two emerging pathways of functional upgrading: Industry 4.0 and defence/dual-use industries. Both create opportunities for the development of higher-value functions related to engineering, software, systems integration, automation, and advanced technological capabilities.

Several widely used simplifications are identified and criticised in the paper, including the treatment of Western Europe as a stable benchmark, CE as a homogeneous bloc, automotive assembly as representative of the region's broader industrial trajectory, and foreign-controlled final production as exhaustive of its developmental path. Ultimately, we argue CE's trajectory is best understood as one of selective repositioning rather than simple convergence with the Western European core.

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KULCSSZAVAK: feldolgozóipar földrajza; centrum-periféria vita; Közép-Európa

ABSZTRAKT: Közép-Európa – Lengyelország, Csehország, Szlovákia, Magyarország, Románia és Szlovénia – az Európai Unió egyik legjelentősebb feldolgozóipari régiójává vált az elmúlt két évtizedben. A meglévő értelmezések ezt az átalakulást túlnyomórészt olyan fogalmakkal magyarázták, mint a függő fejlődés, az integrált periféria, a félperiféria vagy a gyárgazdaság, kiemelve a külföldi működőtőke-befektetések, a külső vállalati irányítás és a transznacionális termelési hálózatokba történő integrálódás meghatározó szerepét. Bár ezek a megközelítések továbbra is a régió

fejlődésének fontos vonásait ragadják meg, egyre inkább alábecsülik Közép-Európa differenciált és folyamatosan alakuló pozícióját a változó európai feldolgozóipari rendszeren belül. A tanulmány amellett érvel, hogy Közép-Európát nem statikus feldolgozóipari perifériaként, hanem az európai munkamegosztáson belül szelektív és egyenlőtlen újrapozicionáláson átmenő régióként kell értelmezni.

Az elemzés Eurostat-adatokat, Európában működő japán érdekeltségű cégekre vonatkozó JETRO-felméréseket, valamint korábbi kutatási projektekben gyűjtött vállalati szintű bizonyítékokat kombinál. A centrum–periféria viszonyok három dimenziója – a piaci, a hálózati és a funkcionális perspektíva – közötti megkülönböztetést javasoljuk.

Az eredmények azt mutatják, hogy Közép-Európa jelentősen megerősítette pozícióját az európai feldolgozóiparon belül. A régió részesedése az EU feldolgozóipari kibocsátásából számottevően nőtt, különösen nagyarányú növekedéssel a járműgyártásban, az elektromos berendezések gyártásában, a bútoriparban, a gumi- és műanyagiparban, valamint a gépipari ágazatokban. Ezt a növekedést elsősorban a termelékenység javulása és az exportbővülés hajtotta, nem pedig a foglalkoztatás növekedése. Ugyanakkor a régió komoly belső sokféleséget mutat az iparszerkezet, a külföldi tulajdon, az innovációs képességek és a gazdasági diverzifikáció szintje tekintetében. A JETRO-felmérésekből származó bizonyítékok arra utalnak, hogy Közép-Európát egyre inkább jelentős termelési platformként és fontos piacként is érzékelik, ami az európai piaci és hálózati centrum felé megfigyelhető elmozdulást jelzi. A funkcionális centrum felé történő előrehaladás azonban jóval korlátozottabb marad, mivel a székhelyek és a magas szintű K+F funkciók továbbra is Nyugat-Európában koncentrálódnak.

A tanulmány az endogén és exogén fejlődési tényezők változó együttesét azonosítja. A növekvő munkaerőköltségek, a demográfiai korlátok, az energiabiztonság, az infrastruktúra minősége, a digitalizáció és az intézményi kapacitás egyre inkább alakítja a regionális fejlődést. Ezzel párhuzamosan a geopolitikai átrendeződés, a nearshoring, az ellátási láncok regionalizálódása és a bővülő uniós szabályozási keretek megváltoztatják a feltételeket. Külön figyelmet kap a funkcionális felzárkózás két kibontakozó útvonala: az Ipar 4.0 és a védelmi/kettős felhasználású iparágak. Mindkettő lehetőséget teremt a mérnöki tevékenység, a szoftverfejlesztés, a rendszerintegráció, az automatizálás és a fejlett technológiai képességekhez kapcsolódó magasabb hozzáadott értékű funkciók fejlesztése számára.

A tanulmány számos széles körben alkalmazott leegyszerűsítést azonosít és bírál, köztük Nyugat-Európa stabil viszonyítási alapként történő kezelését, Közép-Európa homogén tömbként való felfogását, a járműösszeszerelésnek a régió tágabb ipari pályájára nézve reprezentatívként történő kezelését, valamint a külföldi irányítású végtermékgyártás e fejlődési pálya kizárólagos jellemzőjeként való felfogását. Végső soron amellett érvelünk, hogy Közép-Európa fejlődési pályája leginkább szelektív újrapozicionálásként érthető meg, nem pedig a nyugat-európai centrummal való egyszerű konvergenciaként.

Introduction

Over the last two decades, Central Europe (CE) has become an increasingly important manufacturing space within the European economy. Its role has expanded through the rapid growth of industrial production, deeper integration into continental production networks, and the accumulation of capabilities in a number of medium- and high value-added manufacturing industries. Dominant interpretations of this trajectory have most often framed it as a form of asymmetrical integration into the European and global division of labour, which is variously described in the literature as dependent development, factory economy, integrated semi-periphery, or integrated periphery (Nölke, Vliegenthart 2009;

Pavlínek 2002, 2018, 2022; Pavlínek, Ženka 2016; Szalavetz 2019). These perspectives have captured an essential feature of the region's integration: CE's strong manufacturing growth has been closely tied to foreign investments, external corporate control, and deep insertion into transnational production systems, while the concentration of headquarters, R&D and other strategic functions has remained much weaker than in the core. Taking a more economically and geographically-oriented perspective on industrial transformation one cannot neglect the role of political factors as growth determinants, with special regard to state capacity, institutional strength (Scepanovic, Bohle 2018; Tintin 2013) and resulting power asymmetries. Transformation of CE manufacturing has been driven by agency (Grillitsch, Sotarauta 2020) represented by various political and economic stakeholders including hidden champions (top, fast growing companies, little known to the public – Schenkenhofer 2022; Simon 2009). Following MacKinnon et al. (2009) as well as Grillitsch and Sotarauta (2020) we argue that regional industrial change is shaped by strategic actors and place-based leeadership, not only purely by structures.

Empirically, we focus on manufacturing industries in six CE countries: Poland, Czechia, Slovakia, Hungary, Romania and Slovenia. This delimitation of CE departs from the traditional geographical definition that sometimes also includes Germany and Austria. It reflects a shared historical and institutional socialist trajectory, post-1989 transformation, and integration into the European Union. The core of CE usually consists of the Visegrád countries (Cabada 2018), sometimes (as in our paper) extended to neighbouring states such as Slovenia and Romania.

While we recognise that services, logistics and knowledge-intensive business activities are increasingly important to industrial development, our main concern here is with manufacturing as the sector through which the region has been most deeply integrated into Europe and through which many of its current developmental tensions are most clearly expressed. We seek, not to deny the persistence of dependent integration, but provide a reinterpretation of CE's changing industrial role in a way that better captures internal differentiation, selective forms of upgrading, and the possibility that new, often weakly visible niches of agency may be emerging within a reconfiguring European manufacturing system.

The empirical analysis draws primarily on quantitative data of Eurostat, complemented by JETRO surveys of Japanese-affiliated firms operating in Europe, which provide additional insight into changing market perceptions and business constraints across Central Europe. It is further supported by firm-level databases developed in our earlier research projects, used here in an auxiliary way to contextualise selected sectoral and organisational trends.

The paper is structured as follows. Section 1 revisits the core–periphery debate and introduces the conceptual lens used in the paper. Next sections form a background for further analysis to validate five studied conventional

interpretations. It does it by outlining the key trends in CE's changing position within European manufacturing. Section 3 examines the main determinants of industrial change, distinguishing between endogenous and exogenous factors, before turning to selective pathways that may influence the region's future position more decisively (Industry 4.0 and defence/dual use industries). Section 4 rethinks conventional views on the role and position of CE in European manufacturing. The paper concludes with a section that summarizes the key insights.

The core–periphery debate

The position of CE in European manufacturing has long been interpreted through the lens of core–periphery relations, reflecting varying degrees of dependency, asymmetry and uneven development. Classical approaches – from polarised development theory (Friedmann 1972) to world systems analysis (Wallerstein 1979) and neo-Marxist dependency perspectives – have provided some explanations for why certain regions maintained control over capital, technology and organisations, while others were claimed to remain structurally dependent.

The core–periphery dichotomy manifests across multiple dimensions, with economic dimension remaining the most extensively analysed (Grodzicki, Geodecki 2016). In economics and economic geography, four principal approaches to peripheral development can be distinguished (Domański et al. 2025). The first derives from Friedmann's (1972) concept of polarised development, which argues that core regions concentrate key agents of change, while peripheral regions remain structurally dependent. Crucially, Friedmann conceptualises the core–periphery continuum as dynamic, allowing for both upgrading and downgrading through shifting spatial patterns of economic activity. The second approach stems from Wallerstein's (1979) world systems theory, in which core regions host capital-intensive, high-technology industries and maintain structural advantages that peripheral regions struggle to overcome. Peripheries are characterised by limited economies of scale, weaker agglomeration benefits and lower levels of socioeconomic development, often unable to alter their position within the global system. The third perspective, rooted in neo-Marxist dependency theory (Ghosh 2001), emphasises how transnational corporations shape institutions and production networks (Pavlínek 2018). This results in persistent developmental asymmetries, as peripheral regions experience limited bargaining power and become locked into a "vicious cycle" of dependent development (Dawley 2011). The fourth approach is dynamic and cost-driven, drawing on Vernon's (1966) product lifecycle theory, which explains the relocation of standardised manufacturing from high-cost core regions to lower-cost peripheries as industries mature.

The frameworks sketched above continue to offer important insights into CE's industrial transformation, yet their standard formulations require adaptation to the contemporary realities of global production networks (GPNs) and European industrial restructuring. Processes of globalisation, technological change, environmental crisis and postcolonial critique have shifted scholarly attention towards new drivers of core formation and peripheralisation, including GPNs (Coe, Yeung 2015) and green (Bråten, Wedum, Nilsen 2025; Rodríguez–Pose, Bartalucci 2023), digital (Aasa et al. 2026; Bürgin, Mayer 2020) or twin (Buyukyazici 2024; Cicerone, Losacker, Ortega–Argilés 2026) transitions. Scholars emphasise that these transformations generate new forms of uneven development and core–periphery relationships. Synthesising existing research, Domański et al. (2025) conclude that economic peripheries share several features: low levels of entrepreneurship, specialisation in simple activities, limited diversity of products and services, and weak capacities for generating and absorbing innovation (Eder 2019; Mudambi, Santangelo 2016). The concept of periphery encompasses not only remote, weakly connected regions (Pugh, Dubois 2021) or those specialising in low value-added segments and occupying marginal positions in the international division of labour (Grodzicki, Geodecki 2016), but also underdeveloped territories with limited structural power (Barry 2004). Such areas typically depend on lead firms headquartered in more advanced regions.

Recent literature challenges the binary core–periphery distinction by introducing intermediate categories such as semi-peripheries and integrated peripheries. Semi-peripheries occupy intermediate position in the global economy (Cairó-i-Céspedes, Palacios Cívico 2022; Wallerstein 1979), combining low- and high-value activities – often within special economic zones or through selective forms of global integration (Sidaway 2012) – yet remain heavily reliant on FDI (Mordue, Sweeney 2020; Pavlínek 2018). They differ from classical peripheries through a more developed base of domestic enterprises (Szalavetz, Sass 2023) and, in some cases, the presence of TNC headquarters (Mordue, Sweeney 2020), though their potential for indigenous upgrading remains contested (Coe, Yeung 2015; Pavlínek 2017, 2025). Integrated peripheries have been identified particularly in the automotive industry in Mexico, Spain, Portugal, Türkiye and Central and Eastern Europe (Carrillo 2004; Humphrey, Lecler, Salerno 2000; Layan 2000; Pavlínek 2002). They benefit from proximity to large core markets and slightly stronger labour market dynamics, yet remain characterised by foreign dominance, weak local linkages, low value capture, and highly standardised production (Pavlínek 2018, 2020, 2023). Recent classifications therefore suggest multi-layered hierarchies within global value chains (GVCs; Szalavetz, Sass 2023), while peripherality also manifests in precarious labour markets marked by low wages, temporary contracts and growing inequalities (Drahokoupil 2009; Pavlínek 2016).

Beyond the distinctions between semi-peripheries and integrated peripheries, other typologies of core–periphery relations have been proposed. Based on functional criteria, Pavlínek (2025) highlights three dimensions of core–periphery relations in the automotive sector: trade-based power, ownership and control power, and innovation power. Building on this distinction, we argue that the core may first be identified in terms of market or trade relations, including market size and production or export volumes – this is a market core. Second, a network core can be defined by the strength of regional embeddedness in GVCs (Gereffi, Humphrey, Sturgeon 2005) or GPNs (Coe, Dicken, Hess 2008; Yeung 2015). Because traditional core–periphery models are too static to capture evolving development trajectories (Zöllner et al. 2023), relational approaches are essential for unpacking the intertwined and interdependent socioeconomic processes shaping contemporary core–periphery dynamics. Third, the literature also identifies a functional core that concentrates command and control tasks and/or research and development (R&D) activities. This functional core is typically associated with metropolitan areas that possess dense agglomerations of specialised firms, high-skill labour, and advanced knowledge infrastructures. In the paper, we argue that movement toward one core does not necessarily implies movement toward another core.

Central Europe in European manufacturing

Position of CE countries in the European manufacturing

The growth of manufacturing production in the new CE member states has been faster than in Western Europe (WE) during the last decades resulting in their increasing share in the EU: from 8.1% in 2005 to 12.5% in 2023. The trend has been continued in the post-COVID-19 era when this share has grown from 12.0% to 12.5% within two years since 2021.

The two CE countries with the biggest manufacturing industry, Poland and Czechia, have increased their share most – from 3.9% to 5.2% and from 2.2% to 2.8% respectively. The growth was the least prominent in the case of Hungary (1.5% in 2005 and 1.6% in 2023).

Central Europe plays the most prominent role in the manufacturing of tobacco products (34.5%). More importantly, it manufactures about one-fifth of the EU motor vehicles, electrical equipment, furniture as well as rubber and plastic products. In addition, it represents 14-16% of the EU output in such sectors as manufacturing of computer, electronic and optical products, wood, other non-metallic mineral products as well as printing and reproduction of recorded media, and repair and installation of machinery and equipment (Table 1). Its share exceeds one-tenth of the EU production in 12 out of the 24 NACE

manufacturing sectors. In most of these industries, this share has largely increased since 2008. The major exception are computer, electronic and optical products, where the share of CE has even slightly decreased. Their share in wood and other non-metallic mineral products has risen by 2.6-2.9 percentage points onlyThe manufacturing of electrical equipment as well as rubber and plastic products are important in all the CE countries, the same is generally true for the automotive industry, though Poland's and Slovenia's role in this sector is below their average share in the EU manufacturing. Poland and Hungary are the leaders in tobacco products, Poland and Romania in furniture, while Hungary and Czechia in computer, electronic and optical products. It is interesting that the share of CE countries in the EU production is below the average in such labour-intensive sectors as textiles, wearing apparel, and leather products. However, the same is true for the manufacturing of pharmaceuticals.

If we take a closer look at more detailed classification of manufacturing sectors (Figure 1), we may see that the role of CE is far more prominent in making parts and accessories (37.4%) than in producing complete motor vehicles (15.1%). It is interesting to note that the growth of the share of the CE region in the manufacturing of automotive parts and accessories has been very rapid in the two-year post-COVID period 2021–2023 – from 33.4% to 37.4%. Central Europe also plays a major role in the production of home appliances (25.5%), which is a part of electrical equipment industry.

What is important is the scope of diversification of the manufacturing structure. There are three groups of countries in Central Europe from this point of view. Poland, Romania and Slovenia are characterized by a diversified structure, which is illustrated by the values of Gini coefficient[1] of 0.56–0.58 respectively, Czechia and Hungary have more unequal distribution (0.66) and Slovakia the most unequal (0.73). This is strongly related to the dominance of the automotive sector in some countries. Its share in total manufacturing output reaches a record level of 39.0% in the case of Slovakia, it is also very high in Czechia (29.1%), somewhat lower in Hungary (24.7%) and Romania 21.9%. For comparison, it is 18.8% in Germany. At the same time, the share of the automotive industry in total manufacturing output is 11.1% in Poland and 9.9% in Slovenia, which is similar to France (9.6%). The diversification of French manufacturing is identical as in Poland and Romania (Gini coefficient 0.56), while Spanish slightly lower (0.60). The most diversified industrial structure is characteristic of Italy (0.49).

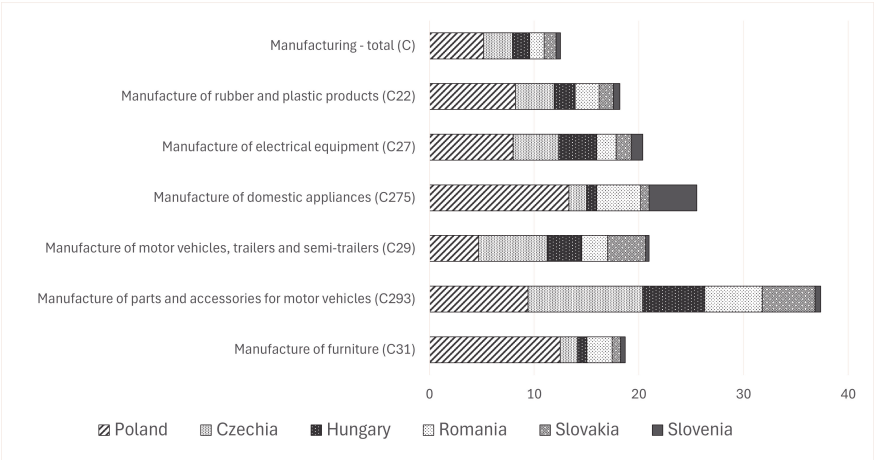
There are major differences in the share of domestic and foreign-controlled enterprises in the manufacturing employment among the countries. The later exceeds 50% in Hungary, Slovakia and Romania, is 45% in Czechia, and significantly less in Poland and Slovenia (34%). This may be compared to 35-38% in the Netherlands and Sweden as well as 23% in France and Spain.

Table 1: Share of CE countries in manufacturing output and employment of the EU by sectors (%)
A közép-európai országok részesedése az EU feldolgozóipari kibocsátásából és foglalkoztatásából ágazatonként (%)

Sector	*Output*			*Persons employed 2023*	*Countries with share above the average for total manufacturing*
	2005	*2023*	*Change 2005–2023*		
Tobacco products	20.1	34.5	+14.4	36.8	Poland, Hungary
Motor vehicles	12.1	21.0	+ 8.9	30.8	Slovakia, Hungary, Czechia, Romania
Electrical equipment	11.7	20.4	+ 8.7	26.8	All CE countries
Furniture	13.7	18.7	+ 5.0	34.0	Poland, Romania
Rubber and plastic products	13.5	18.2	+ 4.7	29.2	All CE countries
Wood products	13.4	16.0	+ 2.6	31.0	Slovenia, Romania, Poland
Computer, electronic and optical products	15.6	15.4	− 0.2	19.4	Hungary, Czechia
Other non-metallic mineral products	12.4	15.3	+ 2.9	24.5	Romania, Poland
Printing and reproduction of recorded media	8.5	14.8	+ 6.3	21.0	Slovenia, Poland, Romania
Fabricated metal products	10.2	14.6	+ 4.4	24.0	Slovenia, Poland, Czechia
Repair and installation of machinery and equipment	8.2	13.6	+ 5.4	21.2	Poland, Czechia, Slovenia
Food products	10.7	11.6	+ 0.9	19.9	Poland
Wearing apparel	8.7	8.7	0.0	27.8	Romania
Pharmaceuticals	5.1	3.3	− 1.8	12.4	Slovenia
Total manufacturing	*8.1*	*12.5*	*+ 4.4*	*22.3*	x

Source: Eurostat, compilation by authors

Figure 1: Share of Central European countries in the EU production in 2023 (%)
A közép-európai országok részesedése az EU feldolgozóipari termeléséből 2023-ban (%)



Source: Eurostat, compilation by authors

The value of exports of the CE manufacturing has increased nine times from 103 billion euro to 914 billion euro between 2000 and 2024. In 2000 was 25-26 billion euro in Poland, Czechia and Hungary each, in comparison to 8-10 billion euro in Slovakia, Romania and Slovenia each. Twenty-four years later, it reached 306 billion euro in Poland, 236 billion euro in Czechia and 129 billion euro in Hungary. Its growth was the fastest in Poland and Slovakia (10-11 times) and relatively the slowest in Hungary (5 times), which partly reflects the earlier growth of Hungarian exports in the 1990s. There are significant differences in the intensity of exports in relation to the size of the country measured by its population. It is the highest in the smallest country of Slovenia (27,900 euro per inhabitant) as well as high in Czechia and Slovakia (21,600 and 19,100 euro respectively), and much lower in Hungary (13,500 euro). Larger economies with bigger internal market – Poland and Romania – show lower export intensity (8,400 and 4,300 euro respectively).

Poland is the largest manufacturing employer in CE, comprising nearly one-tenth of the EU workforce in the sector (9.5%), with Czechia coming second (4.2%) and Romania third (3.7%). At the same time, the share of the six CE countries in EU manufacturing employment has not changed significantly. It was 22.3% in 2023 in comparison to 21.9% in 2005. This shows that the greater role of CE in the manufacturing production of the EU has not stemmed from the increasing number of people employed, but from the rising labour productivity.

Despite its faster growth than in WE in the last decades, the difference between CE share in output and employment reflects still a profound gap in productivity. It reached 92% of the EU average (PPP) in Slovenia in 2023, 81% Czechia and Slovakia, 66–70% in Hungary and Poland, and 60% in Romania. For

comparison, it was 3-5 times lower in CE than in WE in the 1990s. At the same time, a notable real wage growth took place in the region. Between 2009 and 2024, it was 65% in Hungary, 46% in Poland, 30% in Slovenia, and 23% in Czechia, in comparison to 6% increase in France, 3% in Germany, and a decrease of 3% in Italy and Spain.

As a result, the average annual wages in Czechia, Hungary, and Poland, represented about half of the French and Italian level in 2005, have risen to the level of 87% of Italian wages in Poland (constant prices at 2024 USD PPPs), 75% in Czechia, and about 70% in Hungary and Slovakia by 2024 according to OECD. This is 60-73% of the French wages now.

The expansion of manufacturing production in CE has not been accompanied by similarly fast development of research and development capabilities, which finds expression in business R&D expenditures in relation to the value added in manufacturing. It is relatively the highest in Slovenia (5.9%), then in Czechia and Hungary (3.3-3.4%), lower in Poland (2.6%) and the lowest in Slovakia and Romania (1.8-1.9%). This is much less than in France and Germany (8.6-9.0%) but does not differ much from Italy and Spain (3.6-3.8%) now.

In the automotive sector, so important in the region, business R&D expenditure as a percentage of value added has increased in the region from 1.8% to 5.9% between 2007 and 2023, but the gap is still evident. It is relatively the highest in Romania and Hungary (7.8 and 7.4% respectively), then in Poland and Czechia (5.6 and 5.1% respectively), and the lowest in Slovakia (2.1%). This can be compared to 10.8% in Spain, 12.4% in Italy and 20.1% in France.

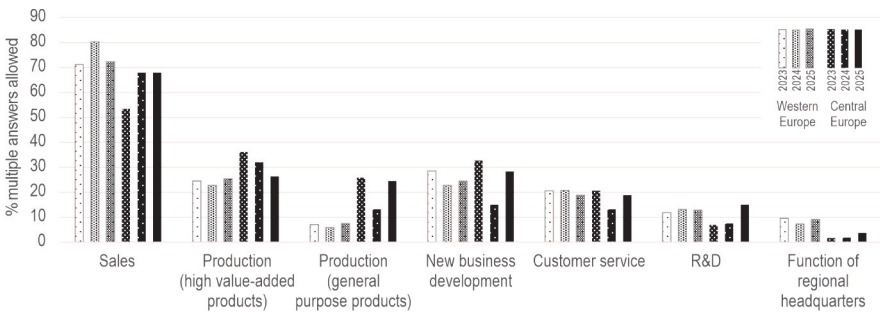
The evolution of manufacturing in Central Europe can be interpreted through a core–periphery framework. The presented data show that CE countries have rapidly expanded their share of EU manufacturing output, driven primarily by export-oriented growth and productivity gains rather than employment expansion. However, this growth is strongly specialised: the region has become a key production base for selected industries, particularly automotive, electrical equipment, and intermediate goods such as rubber and plastics. Its particularly strong role in automotive parts and components highlights Central Europe's successful integration into European production networks, where it has become a key site for high-quality manufacturing within complex value chains. The significant presence of foreign-controlled firms – especially in countries such as Slovakia, Hungary, and Czechia – has facilitated access to advanced technologies, managerial practices, and international markets, supporting rapid industrial development. While productivity and wages have steadily converged toward Western European levels, opportunities remain for further advancement, particularly in strengthening innovation and R&D capacities. At the same time, internal diversity within the region – ranging from more diversified economies like Poland and Romania to more specialised ones such as Slovakia – reflects different development paths and strategic positions within European industry.

Overall, Central Europe's trajectory can be seen as one of dynamic, export-oriented, but selective upgrading, characterised by deep integration into European manufacturing networks and continued potential for moving toward higher value-added activities.

JETRO surveys: CE's selective integration into European manufacturing networks

Additional insight into CE's role within European manufacturing networks is offered by three recent JETRO[2] survey waves of Japanese-affiliated firms operating in Europe (JETRO 2025). These data are not treated here as a direct measure of GVC transition, nor as a representative account of the European manufacturing system. Their value is more modest: they provide a repeated and standardised view of how one important group of non-European foreign investors assesses planned corporate function expansion across Western and Central Europe. In this sense, the surveys are used as a complementary, perception-based source, indicating strategic intentions rather than realised functional relocation (Figure 2).

Figure 2: Corporate functions planned for expansion over the next one to two years by Japanese-affiliated companies in Europe, 2023–2025 (in %; multiple answers allowed)
A következő egy-két évben bővíteni tervezett vállalati funkciók az Európában működő japán cégeknél, 2023-2025 (százalékban kifejezve, többféle válasz is lehetséges)



Source: JETRO surveys (2023–2025), compilation by the authors

Read cautiously through the distinction between market core, network core, and functional core, the three-wave series points to selective and uneven patterns of planned expansion. The evidence does not demonstrate a linear movement of CE towards the European core. Rather, it suggests that Japanese-affiliated firms increasingly perceive CE as relevant in some dimensions of European manufacturing, while strategic functions remain more clearly associated with Western Europe. First, the surveys provide qualified evidence of CE's growing market relevance. Sales remain the most frequently indicated

function in both Western Europe and CE, but in CE the share of Japanese-affiliated firms planning sales expansion increased from 53% in 2023 to 68% in 2025. This should therefore be read not as proof of a transition to the market core, but as evidence that CE is increasingly perceived as a relevant sales and distribution space in its own right. Second, the data are consistent with CE's continued importance as a production network location. Across the three survey waves, planned expansion in CE is higher than in Western Europe for high value-added production, 32% compared with 24% on average, and especially for general purpose production, 21% compared with 7%. Third, the evidence for movement towards the functional core remains weak. R&D expansion is less frequently planned in CE than in Western Europe on average, despite an increase in 2025. Planned regional headquarters functions remain particularly rare in CE, 2% compared with 9% in Western Europe. The JETRO data therefore point less to a transfer of strategic functions than to an asymmetry between market and production expansion, on the one hand, and the still limited capture of strategic control and innovation functions, on the other. Taken together, the repeated JETRO surveys should be read as a perception-based indicator of selective integration rather than as direct evidence of changing GVC positions. They reinforce the broader argument of the article: CE is becoming more important as a market and production network space within European manufacturing, but this does not automatically imply convergence with the functional core. The next section examines the main factors that may either reinforce or narrow this gap.

Changing determinants and selective upgrading pathways

The changing position of CE in the European manufacturing landscape is shaped by the interaction of three broad mechanisms. First, endogenous assets and constraints define the conditions under which production and higher-value functions can be maintained or expanded. Second, exogenous reconfigurations of value chains, trade relations and regulatory regimes alter the criteria of locational competitiveness. And third, major shocks – above all the COVID-19 pandemic, the war in Ukraine and accelerating technological change – that have reinforced the shift from a "lowest-cost" logic towards a logic of capabilities, resilience, risk mitigation and regulatory compliance. Taken together, these developments are moving the axis of competition away from labour–cost arbitrage towards capability-based advantage, in which productivity, automation, infrastructure, energy stability, institutional quality and compliance capacity matter increasingly more. To capture this shift analytically, the section proceeds in two steps. It begins with the broader endogenous and exogenous determinants of CE's changing manufacturing position. It then turns to two more specific, but potentially decisive, pathways through which this changing competitive environment may translate

into a qualitative repositioning of the region: Industry 4.0/5.0 and defence/dual-use. These are treated here not as separate sectoral digressions, but as strategic domains in which the reorganisation of European manufacturing may generate new opportunities for functional upgrading, endogenous capability formation and, in selected cases, greater local control over higher-value activities.

Endogenous factors

The most immediate endogenous constraint is the labour market, understood in terms of quantitative labour supply, labour costs and the compatibility of skills. This is well illustrated by investor surveys, which, despite methodological differences, consistently identify labour as the main bottleneck. In the JETRO survey for Europe, more than 70% of firms in CE reported staff shortages, and among manufacturing firms the share was even higher; factory workers were identified as the most acute segment of shortages. Labour cost growth and difficulties in securing human resources likewise ranked among the most frequently cited operational barriers. This suggests that CE is entering a phase in which further industrial expansion increasingly encounters a profitability threshold shaped not only by wage levels, but also by worker availability and the rising costs of turnover, retention, production losses, quality problems and delivery delays.

This interpretation is reinforced by broader statistical evidence. Although labour costs in several countries of the region remain below the EU average in absolute terms, their recent growth has often outpaced that of Western Europe. If not matched by corresponding productivity gains, such dynamics progressively erode the region's traditional cost advantage and push firms towards greater automation, better work organisation and more capital- and knowledge-intensive modes of production. In the medium and long term, demographic pressures are likely to intensify these constraints further.

A second endogenous factor that has gained strategic importance is energy cost and energy security. The post-2021 energy crisis was not merely a crisis of higher prices, but above all one of volatility and uncertainty, which particularly affected energy-intensive sectors and those segments of supply chains where energy constitutes a substantial share of marginal costs. Energy has therefore become a double competitiveness factor: it directly increases costs and operational risk, while decarbonisation requirements simultaneously compel costly modernisation investments. As a result, firms are increasingly selecting locations not only by price, but also by access to stable, predictable and low-carbon energy systems.

A third endogenous component is infrastructure together with the supply of investment-ready land, investment support instruments and the broader business environment. Central Europe has undergone a long-term process of

infrastructural catching-up, supported by EU funds and domestic public investment, which has significantly reduced its accessibility gap vis-à-vis the EU core and lowered logistics costs. This has strengthened the region's attractiveness for both manufacturing and logistics functions and partly compensates for the erosion of purely cost-based advantages. Yet such compensation works only as long as labour, energy and regulatory bottlenecks do not become dominant in firms' location calculations.

A fourth endogenous dimension concerns the region's capacity for technological and organisational upgrading, including the pace of automation and digitalisation. Available evidence suggests that digital transformation is progressing, but often selectively and unevenly rather than as part of an integrated strategic shift. In the Polish case, most industrial firms report using at least one Industry 4.0-related solution, yet a large majority still lack a formal digitalisation strategy, and only a small minority regard Industry 4.0 as their principal development direction. At the same time, barriers such as outdated machinery, limited investment capacity, skills shortages and weak organisational readiness remain significant. In this context, automation and robotisation function both as a compensatory response to labour shortages and as a test of firms' broader implementation capacity. This is especially relevant because in parts of the region robot density remains below the global manufacturing average, indicating both a lag behind situation and a still unrealised upgrading potential.

Exogenous reconfiguration

With regard to exogenous factors, the reconfiguration of global and intra-European supply chains has become decisive. What increasingly matters is no longer only the optimisation of unit labour costs, but also the optimisation of risk, time, traceability and regulatory compliance. Recent disruptions have led firms to diversify procurement, shorten supply chains, build inventories and improve the digital visibility of production networks. These shifts directly increase the importance of locations within the EU and its immediate neighbourhood. In this sense, CE remains well positioned as a manufacturing platform for European production networks, but increasingly only for those activities that can be combined with productivity growth, automation, digital integration, and stable energy provision.

Geopolitics reinforces this tendency in a double sense. On the one hand, it strengthens the logic of regionalisation and supply security, favouring production closer to final markets and thus potentially also in CE as the industrial hinterland of the EU core. On the other hand, it increases costs linked to energy, logistics, insurance and investment risk, especially for locations closer to the eastern flank of the EU. Moreover, European producers face mounting competitive pressure

from Chinese firms, which combine scale, technological capability and state support in a growing number of sectors. Consequently, CE's future position will depend not merely on whether production shifts closer to Europe, but on whether the region can participate in the continent's broader industrial modernisation in such fields as green transition components, batteries, electronics, automation and resilient industrial infrastructures.

An increasingly important external factor is the expansion of EU regulatory regimes, which now operate as a powerful framework for industrial restructuring. This concerns not only trade- and climate-related instruments such as Carbon Border Adjustment Mechanism (CBAM), but also sustainability reporting, due diligence and data transparency requirements that extend carbon footprint, ESG and traceability obligations along supply chains. For CE, the implications are ambivalent. Regulation may stimulate upgrading by forcing investment in energy efficiency, traceability and digital systems, but it also selects firms and places according to their ability to absorb compliance costs and provide reliable data. In this respect, institutional and technological efficiency are becoming increasingly important dimensions of locational competitiveness, strengthening those regions that have already developed dense ecosystems of engineering services, technology providers and implementation capabilities.

The two major shocks of recent years have accelerated this transformation of the locational regime. COVID-19 ceased to be perceived as a one-off disruption and instead became a trigger for a more lasting change in how firms think about resilience: larger buffers, more alternative suppliers and greater predictability. The Russian aggression on Ukraine, in turn, has functioned as a long-term stress test for European energy systems, security perceptions and investment risk. Importantly, however, it has not only raised costs and uncertainty, but also accelerated political and business acceptance of regionalised production within the EU and of investment in resilience. As a result, Central Europe occupies a paradoxical position: closer integration into European production networks may strengthen its role, while geographical proximity to the conflict zone simultaneously increases the premium on stability and risk management, and this premium is unevenly distributed across countries and sub-regions.

Against this background, the key divide increasingly runs between two trajectories: one based on defending a cost advantage that is becoming progressively harder to maintain, and another based on competing through productivity technologies, digitally integrated supply chains, stable energy and efficient compliance. The latter trajectory is more consistent with the direction of current European industrial and regulatory change. Yet whether CE can benefit from it depends on whether broader structural shifts can be translated into concrete upgrading mechanisms at the level of firms, regions and industrial ecosystems. It is precisely the point where Industry 4.0/5.0 and defence/dual-use sectors become analytically important: they are not additional themes external to the argument, but strategic

domains in which the emerging regime of European manufacturing may be converted into new forms of capability building, value capture and selective functional upgrading.

Industry 4.0

To assess whether Industry 4.0[3] can become a pathway of upgrading for Central Europe, it is useful to distinguish between three interrelated levels: technological change within manufacturing plants, development of domestic technology suppliers, and the extent to which local actors are able to capture higher-value strategic functions. Industry 4.0 should not be reduced to process upgrading within factories alone. Although its most visible effects concern automation, data-driven optimisation and productivity gains, it also opens selective niches for higher-value functions in the broader industrial ecosystem, including systems integration, industrial software, sensors, cybersecurity, digital twins, predictive maintenance, compliance-related services and engineering solutions. These segments are especially important from the perspective of CE because they offer greater scope for endogenous capability building than mass manufacturing itself. A review of the literature (Kordalska, Olczyk 2021; Szalavetz 2020) suggests that, in some CE economies, the digitalisation of production has created niches for more advanced functions, although their scale and embeddedness vary across countries.

Evidence from Poland suggests that the supply side of Industry 4.0 is to a considerable extent formed by domestically owned "digital entrepreneurs" capable of implementing their own technical and software solutions rather than merely distributing imported technologies (Domański et al. 2026; Gwosdz et al. 2024). At the same time, their still limited international reach and relatively weak patenting activity indicate that this potential remains only partially consolidated. Beyond Poland, the evidence suggests that Industry 4.0 has generated selective opportunities for functional upgrading in Central European countries. In Czechia, this is visible in the institutionalised Industry 4.0 ecosystem around the National Centre for Industry 4.0, the CIIRC testbed and the RICAIP infrastructure, all explicitly oriented towards technology transfer and collaboration among academia, firms and SMEs. By contrast, in Hungary and Slovakia, digital industrial upgrading appears to be more tightly embedded in foreign-led automotive networks, even if local niches in software, AI and sensing technologies have emerged (Éltető, Sass, Götz 2022; Krzywdziński et al. 2024; Szalavetz 2025).

Even where adoption of Industry 4.0-related technologies is relatively widespread, strategic commitment often remains shallow. In the Polish case, most industrial firms report using at least one Industry 4.0-related solution. However, a clear majority still lack a formal digitalisation strategy, only a small minority treat Industry 4.0 as their main development direction, and substantial

barriers persist in the form of obsolete machinery, lack of finance, skills shortages and weak organisational readiness (Kwiatkowski et al. 2024). Foreign-owned firms are also more likely than domestically owned ones to possess formal digitalisation strategies, suggesting that part of the observed progress reflects the organisational strength of multinational corporate systems rather than a more general transformation of the regional economy. In the Hungarian case, Szalavetz (2019) emphasises the progress in selected digital technologies, but also a selective and asymmetric pattern of adoption, strongly associated with the presence of foreign automotive firms and Tier-1 suppliers. She argues that Industry 4.0 technologies can upgrade operations and enable subsidiaries to undertake more knowledge-intensive production-related tasks, but that strategic differentiation and value capture remain the domain of lead firms. Firm-level evidence from Czechia also points to uneven readiness and implementation, varying with technological intensity, firm characteristics, and organisational preparedness (Vrchota, Pech 2019).

Moreover, Industry 4.0 is a territorially and organisationally selective mechanism. Proximity to advanced manufacturing customers matters, especially for flexibility, response time, co-development and spin-off processes, but demand alone is insufficient. What appears decisive is the combination of industrial demand with a minimum critical mass of engineering skills, technical universities, diversified local economies, and innovation support institutions (Baron et al. 2026). Regionally, Upper Silesia and Brno/South Moravia offer the clearest Central European examples of Industry 4.0-related path creation (Baron et al. 2026; Kunc, Tonev 2021; Micek et al. 2022). The former has been analysed explicitly as a case of regional path creation shaped by critical conjunctures, while the latter illustrates a testbed- and intermediary-based ecosystem for smart manufacturing; together, they support the view that Industry 4.0 upgrading is territorially selective and depends on the coupling of inherited industrial competences with digital and engineering capabilities.

Consequently, Industry 4.0 should be treated not as a generalised path of upgrading for the whole CE region, but as a conditional and unevenly distributed opportunity space. It is most likely to generate durable regional upgrading where three conditions coincide: first, a strong local base of engineering and digital capabilities; second, effective coupling between industrial demand and domestically embedded technology suppliers; and third, room for domestic firms to move beyond implementation towards design, coordination, product-service development and international market expansion. Where these conditions are absent, Industry 4.0 is more likely to remain a mechanism of process modernisation and organisational adaptation than a pathway towards a less dependent position in the European division of labour.

Defence and dual-use

Among the upgrading pathways currently emerging, the defence and dual-use sectors may prove particularly important for CE. Unlike most civilian industries, the current expansion of the defence sector is driven by a distinctive combination of urgent geopolitical imperatives, stable public procurement, rising national defence budgets, and a more interventionist European Union industrial policy framework. CE enters this new context with considerable advantages. The region combines a strong manufacturing base with a diverse spectrum of defence and technology firms, ranging from nationally controlled enterprises to more specialized producers. At the same time, the countries of the region do not approach this opportunity from a uniform starting position. Poland and the Czech Republic possess the largest production capacities, Slovakia exemplifies deep but narrow specialization, while Romania retains a substantial state-owned industrial base. The countries also differ in the extent to which defence firms engage in civilian production: in Poland, civilian output is estimated to account for approximately 10% of total production, compared with 37% in the Czech Republic (Wroński et al. 2025).

The steady increase in defence expenditure across all CE countries (in 2024 defence expenditure contributed to 4.2% of GDP in Poland; 2.3% in Romania; 2.2 % in Hungary; 2.0% in Slovakia; 1.9% in Czechia; 1.3% in Slovenia) expands the scope for the creation of new modernization trajectories. Additional momentum is provided by European Commission initiatives such as SAFE and related instruments. These measures strengthen local content requirements by limiting the share of imports from outside the EU to a maximum of 35%, potentially helping to overcome one of the major constraints of a new industrial pathway in CE. This is especially relevant given that, between 2020 and 2024, more than half of EU defence imports originated from the United States. Consequently, the key analytical distinction is not between countries that do or do not expand defence production, but rather between those that merely manufacture within a system designed elsewhere and those that increasingly contribute to shaping the system itself. This may occur through increased investment in research and development – particularly significant given the exceptionally high R&D intensity of the defence sector (National Science Board 2020) – or through enhanced technology transfer.

As in the automotive industry, CE countries are developing – or seeking to develop – capabilities that extend beyond the final assembly of major military platforms. This opportunity is particularly significant in dual-use technologies such as sensors, secure communications, cyber technologies, robotics, autonomous systems, simulation technologies, digital twins, counter-unmanned aerial systems (C-UAS), and electronic warfare. In these fields, strategic value lies not only in platform manufacturing but also in design, system integration, software development, control systems, certification, and lifecycle support services. Such

capabilities are often acquired through technology transfer arrangements associated with large procurement programmes, as illustrated by Poland's acquisition of Abrams tanks, Czechia's procurement of CV90 infantry fighting vehicles, and Slovakia's purchase of the Barak MX air defence system.

The defence and dual-use sectors therefore have the potential to become mechanisms of genuine functional upgrading, provided that several conditions are met: domestic ownership or strategic control over key assets, strong engineering and software-development capabilities, durable linkages between military demand and civilian innovation ecosystems, and the capacity to transform emergency procurement contracts into internationally competitive products, certification pathways, maintenance functions, and export channels.

Rethinking conventional views on CE's manufacturing position

Yet the explanatory power of the existing common assumptions about manufacturing in Central Europe becomes limited when they are treated as exhaustive accounts of the region's current trajectory. They tend to understate three developments that have become increasingly important. First, the European manufacturing core itself is changing and, in relative global terms, weakening (Capello, Cerisola 2023; Radicic et al. 2023). Second, CE is far more internally differentiated than many aggregate accounts suggest (Hruby, 2024; Pelle, Tabajdi, 2023; Shkolnykova, Wedemeier, 2025); and third, that selective forms of upgrading are emerging in areas that lie beyond the conventional image of the region as merely an export platform or dependent production base (Medve-Bálint 2024). The issue, therefore, is not whether dependent integration has disappeared, but whether the existing analytical vocabulary is sensitive enough to the differentiated ways in which CE is being repositioned within European manufacturing.

We argue that CE should be approached less as a static manufacturing-oriented (semi)periphery and more as a region undergoing selective repositioning within a changing European division of labour. This repositioning is real, but uneven. The key issue, therefore, is not simply whether CE is "moving towards the core", but how far this movement extends across different dimensions of core–periphery relations, which old and emerging factors shape it, and why dominant interpretations often fail to capture its changing nature. Therefore, this section revisits several widespread assumptions about the peripheral position of CE that, in our view, no longer fully capture the region's changing role in European manufacturing. Rather than denying the persistence of structural asymmetries, we argue that conventional interpretations remain overly shaped by static core–periphery thinking, excessive regional aggregation and selective empirical lenses that privilege particular sectors, firm types and ownership structures, thus obscuring the differentiated and evolving character of industrial change across the region.

Simplification 1. The assumption of a singular and static manufacturing core

The problem with the conventional core–periphery lens is not only that it underestimates Central Europe's upgrading, but also that it treats Western Europe as a singular and stable benchmark. In reality, the WE core has itself been reworked over the last three decades: national hierarchies have shifted, command, innovation and production functions have become more regionally differentiated, and the classic Blue Banana is better understood today as a more differentiated constellation of specialised metropolitan and industrial clusters. At the same time, Europe as a whole has been losing relative weight vis-à-vis China (Al-Haschimi et al. 2024; Draghi, 2024). Consequently, the rise of CE should be interpreted not as a linear movement towards a fixed Western core, but as repositioning within a reconfigured European system that is itself under growing pressure in the global hierarchy. In other words, CE cannot be adequately understood as converging on a stable Western model alone, but moving within a shifting and internally uneven European core whose own global centrality has weakened.

Adopting the perspective of a changing and weakening European core fundamentally alters the analytical lens through which CE's position is understood. In the classical view, CE appears as a region assessed against a ready-made model of development located in WE. Yet if the core itself is dynamic, functionally differentiated and internally uneven, the core–periphery relation can no longer be understood as a configuration of two stable territorial blocs, but rather as a movement of positions within a changing system of dependency, specialisation and control. This also changes the object of comparison: instead of juxtaposing "CE countries" with "Western countries", the key question becomes which core functions are developing in Central Europe, how dynamic their growth is, to what extent they are territorially embedded, and at which spatial scales they are concentrated – from industrial regions and metropolitan areas to networks of firms, knowledge and competences. Therefore, the category of catching up becomes only partly adequate. What matters is no longer simply whether CE is "entering the core", but whether it is able to capture new functions under conditions of European restructuring, transform production upgrading into functional upgrading, develop its own design, engineering, software and organisational competences, and create actors capable not only of producing, but also of co-organising value chains. At the same time, the scale of analysis shifts: CE is not only a periphery of the West, but also an internal frontier of European reconfiguration under conditions of Europe's relative weakening vis-à-vis the United States and China. This implies the possibility of simultaneous upgrading within Europe while remaining part of a weakening macro-core, and therefore the need for a twofold analysis – both in relation to WE and to the global shift in the centre of gravity towards North America and

Asia. From this perspective, the analytical focus should concentrate on the capacity to build indigenous capabilities: the density and quality of local developmental capacities, the strength of firms capable of internationalisation, emergence of technological niches, the competences of integrators and knowledge-intensive service providers, and the role of institutions supporting branching and path creation. What is therefore at stake is no longer an aspiration to a mythical core, but the construction of a more agentic and strategically defined position within a reconfiguring European system.

Simplification 2. The assumption of a homogeneous Central Europe

The problem is not simply that CE is diverse, but that its internal differences concern precisely those dimensions that matter most for industrial upgrading: market size, sectoral diversification, ownership structure, non-production capabilities, institutional trajectories, and exposure to geopolitical and technological restructuring. Treating CE as a coherent manufacturing region obscures differences in path creation between countries and regions that are analytically fundamental rather than merely contextual. The first concerns scale and the scope for diversification. Larger economies, above all Poland, possess greater sectoral breadth, larger domestic market, wider supplier base and stronger potential for generating indigenous firms capable of internationalisation, whereas smaller economies such as Slovakia or Slovenia may achieve high specialisation in selected branches while remaining more weakly diversified and therefore more exposed to sector-specific shocks. A second dimension is the ownership structure and the role of domestic capital: countries differ significantly in the weight of foreign-controlled production vis-à-vis locally rooted firms able to develop brands, technologies and cross-border expansion strategies, and this has major consequences for functional upgrading and strategic autonomy. Third, CE is marked by different sectoral structures and industrial specialisations: although all six economies have been integrated into the European economy through manufacturing, they do so via different combinations of individual branches, which implies uneven exposure to technological disruption and regulatory change. Fourth, geopolitical and logistical positions of CE countries are far from equivalent. They are varying with proximity to Germany, the Balkans, Ukraine, maritime gateways and major north–south corridors, and thus shaping both the opportunities associated with nearshoring and the risks linked to war, energy vulnerability, transport restructuring and production relocation. Recent business surveys likewise point to uneven expectations and risk perceptions across CE. Finally, these countries increasingly follow divergent political-institutional trajectories: a shared post-socialist legacy no longer translates into a common development model, as they differ in industrial policy orientation, state–business relations, regulatory stability, capacity to absorb EU funds and openness to the

green transition. What follows is that the internal heterogeneity of CE is not a secondary complication but a growing explanatory factor, because it concerns precisely those dimensions that matter most for contemporary repositioning: diversification capacity, ownership patterns, sectoral exposure, geopolitical orientation, and institutional capabilities.

Simplification 3. The representativeness of the automotive sector for CE manufacturing

A substantial part of the literature on CE implicitly treats the automotive industry – more precisely, passenger car assembly – as a shorthand for the region's entire manufacturing trajectory, and then generalises from this highly visible sector to whole national economies. This is analytically problematic, not because automotive is marginal, but because it is both exceptionally important in CE and Europe but structurally atypical (Domanski et al. 2024). The automotive sector in CE does reflect some broader features of post-socialist industrial transformation: faster growth than in WE, high investment rates, rising trade surpluses, relatively weak R&D and strong real wage growth. But it also displays traits that make it more specific than representative: extreme export orientation, particularly strong dependence on foreign-controlled firms and wage levels significantly above the manufacturing average. Moreover, the bias is compounded by a further narrowing of perspective from all manufacturing to automotive, from automotive to final assemblers, and from final assemblers to passenger cars measured in units, which obscures the importance of components, commercial vehicles, buses, batteries, and engineering-intensive supplier segments. The result is a distorted image of CE as more uniformly dependent, assembly-based and externally controlled than the wider structure of manufacturing would justify. This is especially misleading because country differences are substantial: reliance on automotive is far stronger in Slovakia, Czechia, Hungary and Romania, whereas Poland and Slovenia have more diversified manufacturing structures, and the dominance of foreign enterprises is much less generalisable beyond specific sectors. The key issue, then, is not to downplay the role of the automotive, but to avoid turning one strategically important yet non-typical sector into a proxy for the whole of CE manufacturing.

Simplification 4. The emphasis on the final product manufacturing

A large part of the literature assesses CE through the lens of final product markets and lead producers, privileging the most visible end of manufacturing while underestimating the segments through which much of the region's actual industrial integration has taken place. This bias is particularly misleading in CE, where upgrading has often occurred through the expansion of parts, components,

modules and supplier networks embedded in European value chains. The Polish case illustrates this clearly: while the country has become far less important in passenger car assembly, it has developed a large, diversified and advanced supplier base, strong positions in buses, commercial vehicles, engines, batteries and a broad range of components, with parts and accessories accounting for the largest (and growing) share of automotive exports. More generally, focusing on OEMs and final outputs obscures the fact that capabilities, local embeddedness and selective forms of agency are often concentrated in supplier segments rather than in final assembly alone, including among domestically owned firms integrated into transnational production networks. It also neglects the growing importance of the regional and internal market. JETRO data show that five CE countries rank among Europe's top ten future sales destinations, with Poland in first place for five consecutive years. The combined share of local and intra-EU sourcing in CE has exceeded 50%, indicating that the region should be analysed not only as an export platform, but also as an increasingly relevant space of regional demand and procurement. The problem, then, is not that final product manufacturing is unimportant, but that its analytical overrepresentation reduces Central Europe to a platform of assemblers, whereas a substantial part of its industrial significance and coreness lies in intermediate goods, supplier relations and the expanding regional market that sustains them.

Simplification 5. The assumption of exclusively foreign-controlled CE manufacturing

Although foreign-owned firms unquestionably retain a dominant position in several key export-oriented branches of CE industry, construing this dominance as exhaustive of the region's manufacturing economy produces an analytically distorted picture. Comparative evidence indicates that the weight of foreign enterprises is neither uniform across the six countries nor equally generalisable beyond the most internationalised sectors. What is thereby obscured is the gradual, selective, but consequential upgrading of domestic manufacturers, which have accumulated design, product development, organisational and internationalisation capabilities of their own. The regional landscape includes locally controlled firms that operate transnationally in different branches. This may be illustrated by such Polish manufacturers as Maspex in food processing, Nowy Styl in office and public space furniture, Fakro in roof windows, Hungarian Gedeon Richter in pharmaceuticals, Czech Linet in medical equipment, and Slovenian Kolektor and Akrapovič in specialised industrial and engineering niches. The analytical problem, therefore, is not that the literature overstates the importance of foreign capital, but that it too often conflates predominance with exclusivity and treats subsidiary-led industrialisation as the sole developmental logic of the region. Such a framing underestimates the strategic significance of

indigenous firms not because they displace foreign capital, which they generally do not, but because they retain decision-making centres and open the possibility of more independent forms of industrial upgrading within a still highly internationalised manufacturing system.

Conclusion

This paper has argued that Central Europe can no longer be adequately interpreted through a static core–periphery lens. The region has not escaped structural asymmetries, yet its changing role in European manufacturing is increasingly obscured by conventional framings that treat Western Europe as a stable benchmark, CE as a homogeneous bloc, automotive industry as the representative of the whole manufacturing base, and foreign-controlled final production as the most appropriate representative of the region's industrial trajectory. A more adequate perspective sees CE as a repositioning region within a reconfigured and relatively weakening European core, while its internal heterogeneity increasingly matters for how far and in what ways such repositioning can proceed.

From this perspective, the key question is whether Central Europe can convert the ongoing regionalisation of European manufacturing into a more prominent position in the European division of labour – not only as an advanced production base, but also as a network and functional core – a location where functions more typically associated with the core begin to develop. CE's move towards the European core is real but uneven: more visible in terms of market expansion and production network integration than in the capture of headquarters and R&D functions. The key analytical issue, therefore, is which mechanisms may allow CE to translate deeper market and network integration into a stronger position in the functional core of European manufacturing. In our opinion, the most promising opportunities appear where inherited industrial capabilities intersect with new technological, regulatory and geopolitical conjunctures – especially in digitally enabled production ecosystems and in defence and dual-use domains. At the same time, the most consequential opportunities may arise not from isolated sectors as such, but from hybridisation across domains. Hence, twin or even multiple – not only economically, but also technologically and politically driven – transitions, should help CE countries and regions to upgrade their functional position. CE's future position may increasingly depend on its ability to recombine inherited industrial capabilities with emerging technological conjunctures: between defence and civilian applications, between electromobility and power electronics, between automation and autonomous systems as well as between manufacturing and software/data-intensive services. In line with the notion of path conjuncture, such recombinations are most likely to become developmentally significant where historically accumulated competences in production, engineering and organisational learning intersect with new shocks,

policy frameworks and market demands. What makes this especially relevant for CE is that these emerging possibilities are concentrated less in final mass market products than in enabling technologies and system functions. Yet, these opportunities are clearly conditional. What matters is whether firms and regions can move beyond production alone towards design, systems integration, software, certification, and other higher-value functions.

This is also why we suggest, following Pavlínek, Domański and Guzik (2009), and Pavlínek and Ženka (2011) a partial shift in analytical vocabulary. Rather than viewing CE as a manufacturing periphery catching up with a fixed core, it may be more fruitful to examine it as a differentiated reservoir of emerging hidden industrial champions: firms and regional ecosystems that remain weakly visible in dominant narratives, yet are increasingly capable of building competitive positions in specialised niches where manufacturing, engineering and advanced services converge. This should not be romanticised. Many such trajectories remain fragile, uneven and constrained by institutions: finance, ownership structures, and limited strategic control. Nevertheless, this perspective helps foreground those forms of agency, capability formation and path creation that conventional accounts tend to overlook. In that sense, the future of CE may depend less on reproducing the classical trajectory of the Western core than on recombining its industrial past into new hybrid, system-shaping niches and thereby constructing a more agentic position within a reconfiguring European division of labour.

Notes

1 Gini coefficient reflects how evenly total manufacturing output is spread across two-digit NACE manufacturing divisions.

2 The JETRO surveys are treated here as an indicator of the perceptions and strategies of an important group of foreign investors rather than as a fully representative source for all firms operating in the region. Nevertheless, given the relatively large number of respondents from CE, the consistency of the survey methodology across countries and years, and the surveys' direct relevance to issues such as market prospects, procurement patterns and business constraints, they provide unique source enabling comparative cross-national insight into several of the processes discussed in this article.

3 We focus primarily on Industry 4.0, since Industry 5.0 currently functions mainly as an EU policy framework of human-centricity, sustainability and resilience, while its empirical operationalisation remains limited.

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