

RESEARCH ARTICLE



Decarbonization and the Structural Challenges of the Neoliberal State: The Case of the Coal Region in Slovakia

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Abstract: The transformation of the regional economy after the closure of the coal mines can be analyzed from Joseph Schumpeter's perspective as a creative destruction and industrial mutation from the "old" to the "new". Policy narratives of decarbonization operate with the goals of revolutionizing the economic structure into a new climate-resilient system that will resurrect regional development and provide new employment opportunities. However, such a process faces multiple challenges as it confronts neoliberal state policies, globalization, market competition, and multiple structural barriers at different levels. In this study, we analyze the Horná Nitra coal region in Slovakia, where the government, with the support of the European Union, has decided to close the coal mines in 2023. The transformation of the regional economy from post-World War II industrialization has been driven by political pressure and purposeful government spending supporting the development of more decentralized economic structures, based primarily on small and medium-sized enterprises. Building on quantitative and qualitative research, the article focuses on mapping and analyzing the structural obstacles and possible factors supporting the transition. In doing so, this article illustrates the possibilities but also the limitations of targeted interventions in the context of neoliberalism and describes the limits to balancing the social and economic risks that transformation entails.

Keywords: decarbonization, neoliberalism, small and medium-sized enterprises, Upper Nitra region

1. Introduction

Coal mines in Upper Nitra, Slovakia were closed at the end of 2023, after long, complicate negotiations and decision-making process, focused on mitigation of the adverse effects. Mine closures have been in the past often accompanied by long periods of stagnation and marginalization in many regions and varying degrees of attainments in dealing with its negative effects [1–4]. In particular, the United Kingdom and the mine closures of the 1980s still provide a negative example of how inflexible policies can lead to decline and long-term adverse impacts on the regions concerned [5, 6].

The article emphasizes the importance of examining the specific case of mine closures in Slovakia and their impact on regional economic transformation. Such an examination is essential for developing comprehensive policies that address the socio-economic challenges posed by the transition and maximize the effectiveness of policies aimed at managing the process.

Upper Nitra is a region in western and northern Slovakia that underwent a process of rapid industrialization from the late 19th century, rushed after World War II a process that was in many aspects linked to cheap and abundant coal power. Alexander Gerschenkron points out that latecomers to the path of

industrialization have certain distinctive features. The growth of industrial production is faster, and there is more pressure to create large industrial enterprises and firms [7]. Over the time, these large industrial enterprises and firms become backbone of regional and/or national economy and provide centralized and hierarchical, yet safe and relatively well-paid employment opportunities. Globalization, outsourcing, and relatively recent pressure on decarbonization of national and regional economies, affiliated with new policy priorities influenced by climate change, bring end to this model.

Transformation is a permanent feature of capitalism. While Marx [8, 9] perceived the processes of industrial transformation more in terms of the accumulation of wealth, Schumpeter [10] describes them as a process of industrial mutation which continually overturns the economic structure from within, continually destroys the old one, and continually creates a new one. Schumpeter coined this process a creative destruction. "The 'old' must make way for the 'new', which will better adapt to the needs of the capital and provide a start and new opportunities for prosperity".

Contrary to popular narratives, studies of the industrial evolution from early England to latecomer South Korea point out to the central role states play in securing the transformation [7, 11–13]. Earlier stages of industrialization, which arose from creative destruction, were promoted by governments based on wealth creation, economic development, and competition with

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other nations. They took place within the framework of the strong power of the state and its ability to create favorable frameworks for the ‘new’.

The narratives of decarbonization reflect needs for the creative destruction as the elementary precondition for climate change mitigation and survival of mankind [14]. End of coal mining and the transformation of industries and industrial hubs linked to coal and fossil fuels should create new forms of decarbonized economies. However, economic transformation is taking place in contexts of weakening states, whose trajectory is leading to rapidly growing economic and social problems and disparities.

In Upper Nitra, the Slovak government, with the support of the European Union, has decided to close local coal mines in 2023. Will massive government spending to support the development of a decarbonized and decentralized economic structure lead to a viable and sustainable new model? In a region like Upper Nitra, how can we move from a centralized regional economy that is enveloped by old polluting industries to new decentralized structures in the context of state transformation and without seriously impacting on people’s well-being and regional prospects? The key research question is: What are the structural barriers to a sustainable new economic model based on regional decarbonization, and what are the options for addressing them?

Both quantitative and qualitative research methods were used in the process. In assessing the regional transformation process associated with mine closure, it is necessary to understand the regional situation and economic and social performance, as well as the operating environment, the national and EU cohesion policy context, and the factors shaping the transformation during decarbonization processes. Building primarily on data from the mining company, FinStat, and Slovak Statistical Office, we focus on descriptive analyses of the regional economy and its trends. The quantitative indicators and information were triangulated with qualitative data from our research conducted in the period 2018 – 2023. Here we focused on analyzing situation and perspectives of the regional economic transformation from the point of view of key stakeholders (e.g., mining company, Slovak Business Agency, Ministry of Economy, Information Advisory Centre, and the local NGOs and municipalities). The methods included a desk study of available materials, visits, non-participatory observations, focus group, and in-depth interviews.

2. Conceptual Framework

As we argue in this paper, decarbonization policies face a number of structural obstacles embedded in the advancing neoliberal state. Attempts at successful regional economic transformation are under pressure from global and regional (European Single Market) competition and an institutional and legal framework of public spending cuts, deregulation, and laissez-faire expansion. The study focuses on the analysis of the transition process and its assessment in the context of the mapped challenges within the context of the neoliberal state.

Regional decarbonization may be analyzed as a process when a territory is substantially transforming its economic and social system though closing or downsizing its fossil fuels-based industrial model and moving to decarbonized production and consumption patterns. This “creative destruction” is than combination of targeted interventions from different level of governance redirecting private investments harnessing market forces and engagement of stakeholders. Success depends on many external and internal factors, and decarbonization may positively or negatively influence well-being and welfare of the inhabitants.

A key external factor is the changing global and national economic environment, reflected in development, economic, and social policies. Jessop [15] argues that regional development and the decline of some regions is primarily due to neoliberal restructuring of the organization and functioning of the economy, the state, and its policies. If this may be true in general, it is even more so in the case of decarbonization, where state projects rapidly change the economic structure of a region. Although creative destruction and resurrection may have taken decades in the past, decarbonization in its simplest forms can take several years. In principle, it often starts with the closure of coal mines, ironworks, or associated industries.

Decarbonization policies are at the European and national level guided by the Paris Agreement and European Green Deal with its goals of carbon neutrality by 2050. According to the Green Deal, mobilization of private investment and industry is crucial. It is planned to take 25 years for transform European industrial sector and all the value chains [16]. The process is financially supported by the EU and national governments through redirecting and focusing existing financial schemes and through newly established Just Transition Mechanism (JTM). Under the JTM, EU Member States are prioritizing their regions for piloting Regional Decarbonization Action Plans. This is leading to a significant acceleration of decarbonization policies, initially focusing on the phase-out of coal mining and the transformation of large carbon-intensive industries.

In this context, we may analyze the rise of a distinctive low-carbon polity as an ideological state-level project [17], which aims to steer economic transformation, but may have its limits in the prevailing forces shaping regional development. Low-carbon polity as an ideological state-level project here clashes with the overall context of neoliberalism, or neoliberal state, as the progressing form of political arrangement.

Neoliberalism is generally characterized as market-oriented reform policies aimed to deregulate capital markets, eliminate price controls, and decrease trade barriers. The overall goal is to minimize state influence in the economy, especially through privatization and austerity measures. According to Cerny and Evans [18], the neoliberal state focuses on disempowering the state from within with regard to a range of key tasks, roles, and activities, in the face of processes of globalization.

Neoliberalism promotes market-focused reforms of international governance structures. Cerny and Evans [18] point out that the process is guided by introduction of an embedded financial orthodoxy, the extension of pro-competitive industrial policies at the micro-level, but also the reform of the constitutional order, the flexibilization of the state apparatus, the creation of a contractual post-social state. Privatization of services, re-commodifying labor, and outsourcing of production inevitably leads to undermining of the welfare state. As pointed out by Jessop [15], contrary to post WWII accent on Keynesian policies and addressing market imperfections, neoliberal perspective is built on some version of Schumpeterian workfare post-national regime.

Schumpeter [10] highlights innovation and technological change as critical dimensions of economic change and replacement of old ways of doing things by new ways will ultimately undermine and destroy the capitalist structure. Using metaphor of creative destruction, decarbonization is but an episode in the ongoing destruction of the economic structures from within, while sooner or later the market will establish a new equilibrium.

In this context, the decarbonization policies of the EU can generally be seen as both consistent with and antithetical to

general neoliberal trends. While they are in line with privatization and liberalization, subsidies and support for regional development, industry and services are again in line with the overall logic of creative destruction. The perspective here is that state interventions in economic and social activities do not go against the overall deregulation of labor and financial markets, and all end up unleashing the internal force of capitalism, increasing welfare and gradually improving incomes and living conditions for all.

Decarbonization policies are primarily based on the promotion of interventions supported by financial schemes. Emerging regional economic structures, focusing SMEs, and businesses in broad terms are considered key to securing economic development, innovativeness, job generation, and societal integration. Evolution of a new decentralized economy should counterbalance impacts of declining fossil industries. The role of SMEs as drivers of economic growth and creating the conditions through investment in infrastructure, education, and human capital is seen as crucial.

3. The Story of Upper Nitra

In what follows we analyze situation in Upper Nitra, Slovakia. It is an industrial region with prevailing mining and quarrying, manufacturing, and construction. The region is one out of 41 coal regions in 12 EU Member States selected as a priority for interventions and support. The lignite is of a poor quality. The mining and coal burning left behind high level of pollution and high investment needs for rehabilitation and dealing with adverse effects [19–21]. The government in 2018 approved that the mines are going to be closed by December 2023.

The mining company together with coal burning power plan generated substantial employment. Yet when we take productivity (revenue per employee), it is a different picture, as it declined by 19% over the last decade (2010–2020). The regional economy had been going through the process of diversification even before the plans for mine closure materialized. The HBP coal mine and its subsidiary HBz have become one of the largest employers in the region. Foreign-controlled enterprises in the manufacturing industry are an important player and in the same decade multiplied their capacities and revenues (e.g., FORTISCHEM, ILJIN, Brose, Nestlé, or GeWiS).

The mining was gradually declining, but it was still the economic backbone. The number of employees of mining companies is around four thousand in the 2010s. In addition to the risk of direct employees losing their positions, we calculate that we have an additional 3,000 to 5,000 indirect jobs that could be impacted [20].

Detailed analysis of enterprise structure and industry in regional dimension of Upper Nitra is strongly limited by data availability at different regional statistical levels of NACE. In the absence of specific regional data on employment or value-added, we apply approach based on number of enterprises by economic activities (NACE rev. 2) and districts Partizánske and Prievidza (LAU 1). Location Quotient (LQ) in the Annex 1 measuring concentration of industry in the national context points out to the strong position of the mining industry, yet also diversification trends. Measuring the concentration of industry in the national context points to the strong position of the mining industry, yet also to trends of diversification. A moderate concentration (above national level) includes labor-intensive sectors such as wholesale and retail trade, automobile and motorcycle repair, accommodation, and food services. A relatively higher proportion of SMEs in these sectors creates opportunities for regional economy decarbonization strategies. From the point of view of the gradual transition to a

decarbonized regional economy, some advantage is provided by the moderate concentration in two service sectors: human health and social work activities, the arts, entertainment, and recreation (knowledge intensive industries). In terms of a gradual transition to a decarbonized economy, some advantage is the moderate concentration in two service sectors: Human health and social work activities and arts, entertainment, and recreation (knowledge intensive industries).

Action Plan for Transformation of Coal Mining Region Upper Nitra [22] was adopted by the regional stakeholders and by the government in 2019. Financial recourses from the state budget, JTM, and other sources are programmed for the smooth transformation. The core of the economic transformation activities is in the Pillar II (Economy, entrepreneurship, and innovation), in particular, in the request to mobilize resources, interventions, and targets for economic advancement. Investments in infrastructure, education, and training should create favorable conditions. Existing and new businesses will then provide the jobs lost in the transition and support the local economy once the mines have closed. As we write below, there are several structural obstacles to these plans.

4. Drivers and Structural Barriers to Decarbonization

The Upper Nitra and our empirical research here point out to several structural barriers to decarbonization at the regional level. The ability of regions to transform depends to a great extent on the internal factors and initial conditions. As demonstrated by Boschma [23], regions differ in their ability to develop new and upgrade existing value chains, accommodate and exploit shocks, while local capabilities consist of many dimensions such as knowledge, skills, and institutions. Because regions have different capabilities, they also have different diversification of opportunity spaces [24]. In other words, regions based on agricultural production can hardly transform into a hi-technology hub and it is evolution based on initial conditions, rather than a leap into completely new areas.

Firstly, the Upper Nitra is in this context in relatively good starting position. When we analyze existing structure of the economy, we find most of the enterprises in services and manufacturing and in sectors with small added value and competitiveness perspectives. This can be seen when we match the production patterns with the Research and Innovation Strategy for Smart Specialization of the Slovak Republic (RIS3). Comparing the proportion of revenues of each domain of smart specialization (1 to 5) in the entire revenues of the region, industries outside the sector of smart specialization generate 60.7% of revenues. This figure indicates that majority of the enterprises have little potential in areas defined as technologically perspective and primary target for interventions and support, as Table 1 [25] shows.

This analysis indicates several aspects important from the perspective of the regional decarbonization processes. The sector of SMEs is gradually moving to the service industries, where the prospects and revenues of firms are particularly good in health and social care, financial services, and professional or technical activities. Yet, at the same time, manufacturing at 39% of overall sales and building sector with 17% remain strongholds of the sector. The challenge is that the manufacturing, industrial, and construction firms are also exposed to the need to decarbonize its activities. In the same time, 60.7% of revenues in the SMEs coming from domains outside of smart specialization indicates

Table 1
Proportions of smart specialization areas in the Upper Nitra (%) in 2017

Section NACE Rev. 2	Number of enterprises			Revenue			Gross added value
	HN	Partizánské	Prievidza	HN	Partizánské	Prievidza	Slovakia
1-Cars for the 21st century	0,1	0,0	0,1	1,1	0,0	1,5	4,3
2-Industry for the 21st century	5,4	6,1	5,2	25,4	30,4	23,8	12,9
3-Digital Slovakia and Creative Industry	4,6	3,7	4,9	1,4	1,1	1,5	5,0
4-Healthy food and the environment	2,8	3,5	2,5	7,9	15,2	5,7	4,0
5-Population health and medical tech.	4,7	5,1	4,6	3,4	2,2	3,7	3,3
Industries outside the domain of smart specs.	82,4	81,6	82,7	60,7	51,1	63,8	70,5
Together	100	100	100	100	100	100	100

Note: Domain 1 includes NACE C29. Domain 2 includes NACE C20, C21, C22, C24, C25, C27, and C28, D35. Domain 3 includes NACE 26 and J58-63. Domain 4 includes NACE A01, C10, and C11. Domain 5 includes NACE Q86; * – Upper Nitra

lower level of technological advancement, worse access to external financial support, and possible dependence on obsolete technologies.

Secondly, we see here a strong supporting mechanism from the side of the EU and Slovak government, aimed to financing transformation and compensate for those lagging behind. John Maynard Keynes argued that governments could stabilize the business cycle and regulate economic output rather than let markets right themselves alone. The approach of the EU and Slovak government is to a great extent based on the cohesion policies respecting this logic [26].

In spite of this ideological background prevailing in many countries including Slovakia, to make decarbonization policies work, the EU and states need to provide some forms of compensation. Public resistance is high and decarbonization may lead to stagnation or decline of Upper Nitra, endangering public support to these policies and undermining next steps in the Slovak decarbonization policies.

The compensatory measures are usually defined as temporary, aimed to increase local capacities and provide necessary infrastructure for the transformation. In other words, temporary compensatory measures which enable regions to copy with the shocks and embark on the prosperity emerge sooner or later from the creative destruction. In addressing the shocks, we see here shift to regional strategies framing and supporting context for projects financed by central authorities, but developed by regional and local actors.

State is in this logic seen as incompetent to understated nuances of local conditions and different capitals available and instead of general welfare programs should support (co-finance) infrastructure and individual approaches generating opportunities in the context of the neoliberal state. As pointed out by Beer et al. [27], there is a tendency to move away from hierarchical forms of government to more porous forms of governance. The latter is characterized by increasing emphasis on involvement of all stakeholders, particularly business. Neoliberal state may provide temporary financing, but it resigns on a leading role. Instead, it is calling for local coalitions (public-private partnerships) forming answers to the problems. In Upper Nitra, this local coalition is led by Prievidza municipality and NGOs in so-called work group. The state, backed by the EU, provides technical assistance and experts and transforms the local approaches to a broader context of Action Plan for Transformation of Upper Nitra and uses information gathered in the region to shape priorities for funding from the EU and domestic sources. The mechanism is illustrated on Figure 1.

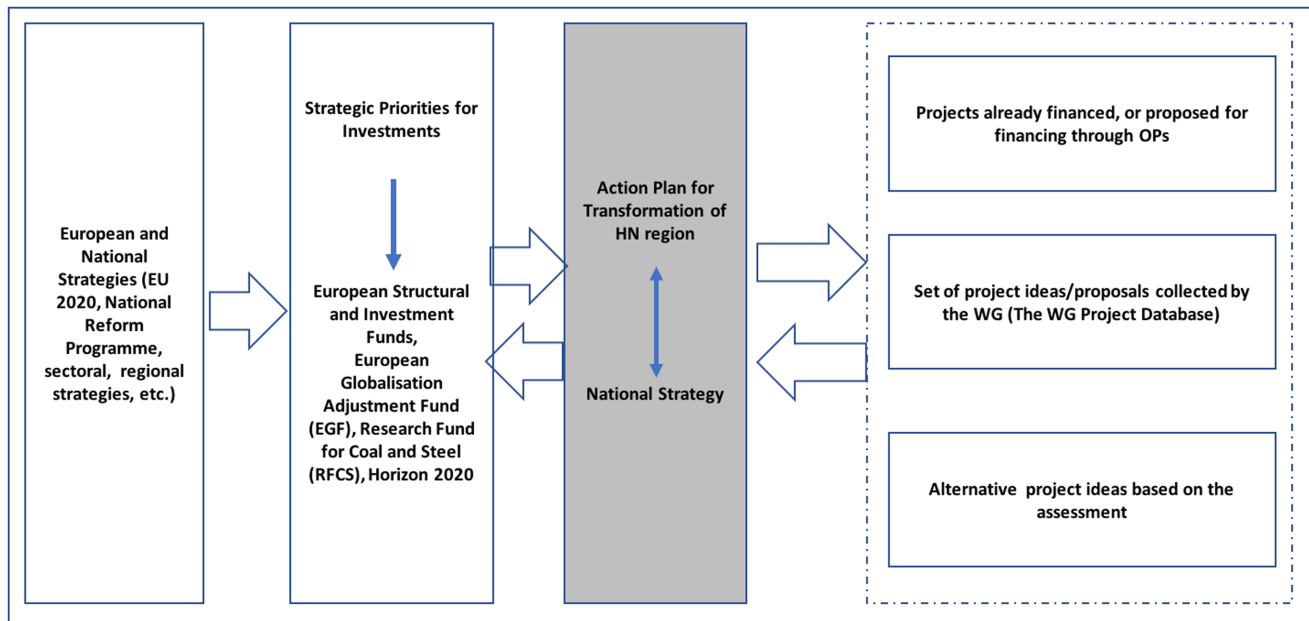
The Action Plan and the National Strategy were developed in the context of national and regional EU policies. Three main clusters of projects were indicated by local stakeholders and proposed for funding. Alongside this, the Task Force, and also the Association of Towns and Municipalities of Slovakia, has created a database of project ideas. In addition to the above, there are also various capacity development initiatives or activities worthy of attention and potential support from the EU or national authorities. These approaches which we identify here build on localism and differentiated answer to differentiated impact of decarbonization. Localism may be defined as a school of thoughts building on local movements and ideas of re-localization, where social and economic changes may occur with the best effects and solutions best reflect conditions and opportunities. Instead of the state planning and compensating role, state as a sponsor supporting innovation and technological change thought enabling local actors and public-private partnerships.

We would argue that decarbonization needs to be part of economic and social transformation of the nation states and cannot be fully implemented in to progressing context of neoliberal state. It is exactly the relative easiness and harmlessness of the localism as a concept, making it so popular among the governments. Government-led development policies are under neoliberal pressure already from early 1990s. While in the past, considerable level of state intervention in non-metropolitan areas was widely accepted, it is now changing. Neoliberal policy gradually abandons active policies in favor of free market forces and local entrepreneurialism.

Ansell et al. [28] maintain that the role of the state is to “empower” stakeholders and facilitate cooperation among them. Ansell et al. [28] further points out that both state agencies and societal associations should increasingly take the form of “network” or “organic” organizations with strong lateral communication and coordination that crosses functional boundaries within and between organizations and can be conducive for mobilizing societal resources, enhancing creative problem-solving, and building broad-based ownership for public solutions.

Outside assistance and financial recourse should combine with what Nemec et al. [29] describe as broad-based contributions of the local community, i.e., the nongovernmental organizations, municipality, business, labor, and local communities who believe that by combining their skills, resources, and ideas, they will uplift their communities economically. It is what Morgenrood [30] defines as an approach toward economic development which allows and encourages local people to work together to achieve

Figure 1
Financial mechanisms in place



sustainable economic growth and development, thereby bringing economic benefits and an improved quality of life for all residents in a local municipal area.

This discourse was very soon taken up by development organizations. The United Nations, the World Bank, and associated institutions are further developing this framework, which is increasingly supported by the European Union and its economic and social cohesion policies. As DG Regio has pointed out, in the 1980s–1990s local development provided answers to rising unemployment in problem regions suffering from the decline of manufacturing or traditional industries, as well as the promise of a new future for lagging areas, both rural and urban.

Local development initiatives are defined here as integrated, area-based strategies that mobilize a large number of local stakeholders using specific methods such as partnerships. The focus on local development initiatives is central to strategies to mobilize economic growth in lagging regions of the European Union and is reflected in central development strategies such as Europe 2020 or partnership agreements between the EC and Member States. While there is extensive evidence on contribution of various schemes, projects, and initiatives brought about by the local approaches, based on the Upper Nitra experience, we argue that the approach has severe limits and little multiplicative effect. As emphasized out by Beer et al. [27], such local development policies are seen as a response of governments to electoral pressure from regions, but a response that is constrained by the dominance of neoliberal ideology. While Upper Nitra may to some extent copy with the aftermath of mine closure, partly due to good initial conditions and concentrated external assistance using local knowledge, such approach is rather costly and time consuming.

Thirdly, regional economic transformation based on decarbonization depends heavily on human resources. Important factor is regional demography with adverse trends. Due to low fertility and high emigration, Upper Nitra faces a population decline and rapidly aging population. If the demographic situation persists, the population of the Prievidza district is expected to

continue to decline to -4.1% and the population of the Partizánske County to -5.4% by 2035 [31, 32]. Prievidza and Partizánske are on the way to be by 2035 among 10 Slovak counties with the most senior residents, with significant implications for the labor market, automatization, purchasing power, and increased demands for social and health services [20, 31, 33].

Demographic trends will further increase demands for coping strategies of the industrial sector and its ability to invest and adjust to a changing market. Size and ownership of the enterprises are increasingly important factor. Significant share of SMEs consists of self-employed persons, concentrated in manufacturing, accommodation, and food services. Shareholding and privately owned and traded companies, hereby referred as legal person, are in minority. We calculate entrepreneurial activity rate as a ratio of number of enterprises (separately for legal persons and self-employed persons) in districts to total population in district. The entrepreneurial activity in Upper Nitra region is lower than on national level and is mostly based on enterprises consisting of self-employed persons, which are highly depended on local/regional market and demand and in the same time may lack internal resources for investments and innovations.

5. Phasing Out Coal Mining and SMEs

Using qualitative research methods, we next analyzed positions and challenges in regional economic transformation from the SME perspective. The areas explored in the context of decarbonization processes are perceived potential of the one's enterprise to copy with the changes, future of employment, development plans, structural challenges and needs. The main identified challenges, directly or indirectly affiliated with decarbonization processes, are in financing, increasing global competition, and changing labor market.

A substantial EU and state aid is planned for regional economy and for counterbalancing losses from closing mines. The *Action Plan*

for Transformation of Coal Mining Region Upper Nitra points out to targeted financing of SMEs, for increasing their competitiveness and decreasing carbon footprint. However, we identified two main barriers to utilize this support. Firstly, SMEs in the defined domains outside of the smart specialization are not eligible for grants and loans from state aid co-financed by the EU. It will inevitably impact their ability for financing decarbonization measures and investments. Secondly, globalization and changes in the regional economy exacerbated by COVID-19 crisis provide very volatile environment for enterprising, influencing development plans of the entities and their potential for transformation.

Enterprises face combined problems of staying competitive in the increasingly globalized market where economy of scale matters. As summarized by CEO of a small enterprise in shoe-making industry, *"We are so far OK because we do specialise in small series shoes for professionals, but even this niche is gradually taken over by multinationals, foreign companies... they are now able with computers do anything and much cheaper than we can ever try"*¹.

In particular in manufacturing, SMEs have been facing growing international (especially from Asia) and regional (from Poland) competitiveness. Although a number of them are thinking about importing semi-finished products or are actually doing so, the transfer of all production to other countries has not been mentioned – it is seen as highly difficult (volatile markets, shortage of human resources). The predominant policy is that companies need to improve their effectiveness while targeting 'niches' that are not as profitable for bigger and multinational firms or on the local consumers. SMEs surveyed were very careful in planning any further enlargement of activities and hiring more people. Main reasons were due to the perceived slowdown of growth (even prior to the COVID-19 crisis), rising global and regional competitions, and increasing salaries.

While governmental strategies see SMEs as a key segment for job creation and absorbing miners released from the work, perspectives of the companies are rather careful. The SME internal evaluation of barriers to growth and increased number of employees may be seen in the context of cyclical, structural, and institutional employment.

Cyclical problems refer to periodic cycles of ups and downs, dramatically deteriorated with COVID-19 crisis. Foreseen closure of the mines may further enhance negative trends in the region. Especially, SMEs in services see decline of the purchasing power and migration of the people out of the region as a threat to their business models.

Important point is perceived general lack of experience and difficulties to find skilled workers. The structural unemployment refers to discrepancies between worker's skills and the business needs. General perception of the managers of SMEs can be summarized by the quotation: *"not many people available, those who want to work already work, the others are better to avoid"*. This was particularly visible in exploring possibilities to employ former miners. Prevailing opinions were that *"miners are usually quite devastated physically after the previous job..."* or that *"[They] have problem to adapt to our style of work"*. As summarized by CEO of a furniture-producing company, *"Our experience [with employing former miners] is that they need much more training and [They] are not so flexible...we need now people even at the lowest positions who can work with computer, are independent..."* These perceptions may be to

some extend stereotypes developed in the community, but may reflect deeper structural problems in employing people or loosing jobs in coal mining, or carbon-intensive enterprises.

However, more than half of the CEO and managers of the interviewed enterprises would be (prior to COVID-19 crisis) willing to employ people specially to replace those retiring, but they reported uncertainty of their future business plans and cost of labor as the barriers. As expressed by a line manager of small enterprise in Prievidza district, *"We do increase salaries, we need to keep our core staff...we do not plan to hire more people...everybody expects new crisis"*. The problem of "high" and rising remuneration is compounded by a shortage of qualified employees.

Virtually, all SMEs surveyed are focusing on keeping their core employees as well as investing in new technologies and industrial robots. Lack of availability of qualified labor is attributed mainly to two factors: The drop in the level and scope of apprenticeships and the operation of the 'invisible hand' – more able and qualified – have already gained jobs in larger cities or abroad. In spite of what is perceived in public discourse as a major problem for entrepreneurs, administrative burdens and taxes are not thematized as a key issue for SME development. Although SMEs would prefer low taxes, this has not been hierarchized as a top objective or a significant barrier to firm development and expansion. Tax issues were also not perceived as a key concern in contracting and expanding the employee base. Rather, the cost of contributions was a more pressing concern, and SMEs indicated the negative impact of the Labour Code and the cost of night and weekend working. In-depth interviews indicated that prevailing strategy of SMEs to address the problem of wage increase was to invest into IT and automatization. As pointed out by manager of a shoe-producing company, *"In next years I replace half of the people you see here [at the conveyor belt] with industrial robots"* The demand for the automatization and robotization stimulates supply. A new local company producing industrial robots reported rapidly increasing market for their products: *"Our aim is to produce industrial robots that are dumb proof...you need zero qualification to operate them"*. Practically, all SMEs included in our sample see automatization as the only viable strategy for the competitiveness and survival on the market.

A third of the SMEs in the research sample operate as subsidiary companies of multinational companies, in the Western Balkans, in Ukraine, and sell products internationally. The main threat indicated is the transfer of part of their production back to nuclear states. Opportunities in green economy were not identified by the SMEs as a key opportunity with the exemption of investments into energy efficiency and renewable energy in the premises to decrease internal operating costs. Climate change and the environment are mostly perceived as "liability" rather than "asset". Firms typically see environmental regulations as obsolete, costly, and decreasing their competitiveness vis-à-vis producers outside of the European Union.

Market with ecological products is still relatively weak in Slovakia. Rather typical evaluation of the potential is summarized by a general manager of a SMEs producing packaging materials: *"market for greener products here [in Slovakia] is still limited, we can easily start to produce more ecological products, but they cost more and price is nowadays dominant in a success"*. On the other hand, it is also example for how public politics may change rules of the game. In 2020, the European Parliament approved an EU-wide ban on the sale of disposable plastic products and it pushed the very same producer to change their production line.

The variety of barriers and challenges facing the SMEs call for strong policy and investment framework, addressing both external

¹Personal interview, Upper Nitra, June 2019.

and internal needs. External needs should address infrastructure, educational system, and capacity development assistance. Internal should address targeted measures for individual SMEs, providing opportunities for better productivity, efficiency, and technology transfers for Industry 4.0.

6. Conclusion

Decarbonization of a regional economy in Upper Nitra context imposes many structural challenges. A new economic structure, emerging on the wreckage of old industries and supported by investments and state interventions, finds itself exposed to regional or global competition. The EU and state interventions are meant to be a temporary measure to enable evolvement of the new economic structure.

As we analyzed on the drivers and barriers, and using perspectives of the local entrepreneurs, successful decarbonization strategies need to understand and address numerous structural challenges. Firms and enterprises which could counterbalance lost jobs and wealth are under manifold pressures. In improving their competitiveness, they are pressed to lowering fixed costs, fasting time-to-market, and effectively addressing complex organizational problems. There is a negative effect of the multinational companies on the growth of local industry which requires policies safeguarding SMEs. There is an imminent threat of automatization and economy of scale enabling multinational companies compete on the global scale and gradually diminish production “niches” for SMEs at the regional or local level. Last but not least, decarbonization is accompanied by increasing environmental awareness as a factor in market competition.

A comprehensive approach to the SMEs and their operating environment not only needs to focus on competitiveness and job creation but also about the quality of the growth and the type of economy we are planning to build. A just, socially sensitive and low-carbon industrial transition in Upper Nitra is a matter of vision, combined with hard and soft measures. Vision and mobilization mean that, besides top-down policies of the EU and Slovak Republic, there is a need for local co-ownership and a bottom-up approach to the decarbonization challenges and opportunities.

Decarbonization processes may be thus accelerating some already existing trends, while generating new ones. Here we may list growing pressure on decreasing carbon footprint, fulfilling increasingly strict environmental regulations and dealing with changing market and consumers’ preferences on the local market. The closure of mining industry or limitations imposed on carbon-intensive industries may lead to increased unemployment and decreased purchasing power. Decarbonization may however push entities to cope with necessary changes faster and improve their long-term competitiveness. Decarbonization strategies should be based on identification of the adverse factors and addressing problematic aspects. Or, if we look at it through the prism of Joseph Schumpeter, strategies should understand what the prospects of decarbonisation as creative destruction are and how public policies should be set to avoid a situation that will eventually undermine prosperity.

Aiming for carbon neutrality in Slovakia by 2050 would require substantial industrial transition not only in the SMEs. The Upper Nitra illustrates bottlenecks and challenges in these processes. As we illustrated, SMEs as the backbone of the transformation face multiply challenges in the decarbonization process. Declining and aging population influences labor market, automatization, purchasing power, and structure of the regional demand for services and goods. The sector consisting from a high share of enterprises

outside of domain of smart specialization and based on self-employment is critically dependent on local and regional markets and face problem with access to investments. Small and medium enterprises at Upper Nitra are largely focused on lower value-added production and services or have a significant need for supplies that are generated by larger and technologically superior corporations.

While we need success stories for meeting the targets of climate neutrality, as we see in the historical perspective, regional decarbonization may lead to lasting consequences and long-term economic decline of the regions exposed to external and internal shocks. The success of decarbonising regions and the results of their transformation and decarbonisation depend primarily on their starting position and initial conditions, and on targeted support from both EU and national actors at different levels. In the case of Upper Nitra, however, support and policies have in many respects gone against the prevailing logic and practice of the neoliberal state, and these interventions represent an exception rather than a pattern of neoliberal restructuring. The transformation clashes with the neoliberalization of the state, increasing international and national competition and multiplicative effects from case study like upper Nitra are limited. The question is if the policies and interventions are sufficient and do have a chance in a longer run against structural economic conditions of the neoliberal state.

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Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

The data that support the findings of this study are openly available at <https://ec.europa.eu/eurostat/web/main/data/database>. The data that support the findings of this study are openly available at https://datacube.statistics.sk/#!/lang/en/?utm_source=susr_portalHP&utm_medium=page_database&utm_campaign=DATAcube_portalHP.

Author Contribution Statement

Richard Filčák: Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition.
Daniel Škoblá: Investigation, Writing – review & editing, Project administration.

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