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Regional inclusion and collaborative frameworks are enablers of innovative job creation

As mentioned earlier, technological transformation might exacerbate inequalities between more and less developed regions, or even between different areas within regions. In essence, economically peripheral regions become gradually excluded from participation, competition in the national/global economy. Thus, there are limited job opportunities and low job creation effect in these regions. This reflects similarities between the regional exclusion and exclusion of individuals on the labour market. In both cases, exclusion leads to negative economic consequences in less developed regions or among vulnerable population groups, calling for support from those capable of offering it, namely more developed regions.

In essence, vulnerable regions or people are perceived as burdens for the economic, labour market and welfare systems. However, the analysis of good policy practices across the case studies revealed that inclusion of these vulnerable entities turns them into an essential resource/asset for the economy and for the society. Their successful inclusion depends on the quality of the strategy, designed by the policymakers.

Based on the case studies, the following successful strategies have been collected:

1. Integration of less developed regions into the value chains of organisations/industries of more developed regions by offering complementary capabilities/resources that result in a win-win situation;
2. Development of preferential conditions in less developed regions and active promotion of them;
3. Shifting some economic activities or public organisations from more to less developed regions (without harming the more developed regions);
4. Establish organisations that will drive the local economy, innovation and attract resources from other regions.

The first and second strategy has been successfully implemented in the Dolnośląskie region of Poland, and in a larger Lower Silesia region. The region experienced significant inequalities between more and less developed areas of the region. To address this, policymakers developed three special industrial zones in less developed areas and stimulated economic linkages within the region through innovation entrepreneurship programmes.

The project "Lower Silesian Innovation Rocket" in Poland aimed to strengthen the economic position of the Lower Silesia as a region of thriving development of innovative SMEs. The project funding of roughly €1million has been provided to selected 36 innovative entrepreneurs that own an SME, operating in the areas of smart specialisation of the region

and having high attractiveness for foreign investors. The funding aimed to integrate selected SMEs into international innovative business networks, as well as, to strengthen local business linkages within the region.

The project has been launched in December 2020 and has carried out activities supporting the development and internationalisation of innovative companies of the region whilst promoting Dolnoslaskie as a region of innovation which is open for investment. The project has been run by the regional authorities and co-financed through national funds and the European Development Fund.

Success factors of the project include:

- Establishment of business contacts by Lower Silesian companies with foreign partners and recipients of products/services;
- Broadening of the reach and connections of these companies, leading to the attraction of more foreign capital and higher international embeddedness into regional/international value chains;
- Access to disruptive technologies and global knowledge pipelines. Providing local companies with new tools to work with, such as simulation and VR-AR technologies.

Capital regions, such as the region of Lisbon, Prague, are home to different governmental bodies, businesses headquarters, high-quality universities. This provides additional advantages to them. In Denmark, the national policymakers applied the third and fourth strategy listed above. Namely, they have shifted several national public administration organisations to the most distant region in the country, the North Jutland region, and contributed to the development of high-quality universities in the region.

The strategy of the local policymakers in North Jutland focused on ensuring high-quality education and on increasing the connectivity and synergies between the local innovation stakeholders. Thus, significant investment has been made in universities, development of technology transfer offices (TTOs) and partnerships between academia/research sector and industries. In view of interviewees, Aalborg University has been the catalyst of innovation and economic development in the region, leading to innovative and inclusive job creation. The University has been contributing to the National Danish Technology Pact (Danish STEM strategy), thereby creating local programmes that focus on promotion and support the development of STEM competences. In addition, Aalborg University has made agreements with the Aalborg PES for the development of upskilling/reskilling programmes for local companies and for the unemployed. In view of interviewees, the collaboration

between the regional PES offices, local industries and the University is exceptionally strong, which helps to reduce skills mismatches on the labour market in North Jutland.

The creation of TTOs encouraged innovation in local businesses, provided scientific expertise and different support mechanisms for commercialisation of research findings, acquisition of technology patents and intellectual property rights. Overall, the university-industry collaborative model of the region has proved very successful. The universities have been attracting young people from other regions, encouraging local young people to undergo education in the region, and then supporting their connection to local industries. This increased availability of skilled labour in the region, stimulated entrepreneurship, job creation and improved the overall reputation of the region.

The discussions with experts on less developed regions/areas always touched on geographic dimension. Most less developed regions are geographic peripheries within countries, meaning they are located further away from economic centres, more developed regions/areas. In essence, the location of these regions is not a problem, but a lack of connectivity to more developed areas and to resources is. Above-listed strategies try to enhance connectivity of these regions, but in this context, it is essential to highlight importance of collaboration and of collaborative frameworks.

As discussed earlier, policymakers from all types of regions have been establishing industrial clusters, setting up business/innovation hubs to stimulate economic development, innovation and job creation. The advantages of such ecosystems include greater accessibility to talent, knowledge, infrastructure, finance for all stakeholders that are part of them. In addition, the collaborative frameworks stimulate synergies and efficiency, R&D&I, facilitate cooperation with diverse stakeholders, may increase the influence of stakeholders on policymakers, help to develop solutions to common challenges, and improve the environment for business and innovation.

The effectiveness of these industrial clusters and business/innovation hubs is conditioned by their connectedness to relevant STI stakeholders (including to the policymakers), accessibility of high-quality expertise/advisory services and financial resources, and by the effectiveness of their coordination/leadership.

The case studies also highlight the importance of university-industry linkages, supported by technology transfer offices (TTOs), R&D&I projects. These linkages are typically challenging, due to the research focus of universities and an academic approach to collaboration. However, they are also vital for commercialisation of research and innovation, therefore in

several regions the policymakers provide financial incentives for long-term university-industry partnerships.

Below are provided a few successful organisations that shape the development of collaborative frameworks in the examined regions.

"Technocampus" are technological research platforms in Pays de la Loire, in France, dedicated to advanced manufacturing. They aim to gather industrial and academic players that work on advanced materials deployed in manufacturing strategic sectors, and stimulate closer collaboration between the stakeholders.

In total, six Technocampuses have been set up:

- Technocampus Océan - located in Bouguenais
- Technocampus Alimentation – located in Nantes
- Technocampus Electronique et l'Internet des Objets (Internet of Things – EoT) - located in Verrieres en Anjou
- Technocampus composites – located in Bouguenais
- Technocampus Smart Factory (specialized in industry 4.0) - located in Montoir de Bretagne (in the vicinity of Nantes)
- Technocampus Acoustique – located in de Le Mans

All Technocampuses are focused on different manufacturing sectors present in the region and contribute to the region's competitive edge. Technocampus Ocean (TKO), for example, is dedicated to marine structures and metallic materials. It encompasses industrial and academic stakeholders that work on developing innovative manufacturing technologies for shipbuilding and Manor Renewable Energy. TKO offers different resources, encourages interdisciplinary approach, collaborative R&D and technology transfer. Thus, it contributes to the excellence of Pays de la Loire in the maritime industry.

Technocampus have been effective in addressing the challenges of industrial competitiveness and technological transformation for the following reasons:

- The platforms focus on the development and innovation in industries that reflect the regional strengths/capabilities and are in line with smart specialisation;
- The platforms capitalise on synergies and competences/resources of all involved stakeholders and stimulates further collaboration within a local ecosystem;
- The platforms enable the creation of durable and inclusive employment. It does so for high-skilled occupations in the concerned sectors, attracting human capital; but also, for low-skilled occupations, as it provides a sense of belonging to the region, improving job satisfaction;

- One of the core objectives of the system is to provide infrastructure and publicly available spaces to stimulate collaboration and common research, better working conditions, increase of productivity and innovative output.

Prague Innovation Institute (Praha Inovační) has been established in 2020 to facilitate connections between education, public sector and entrepreneurs in Prague. In essence, the role of the innovation center is to support innovating stakeholders in addressing various challenges that they face. Thus, the Institute facilitates access to funding, expertise, relevant stakeholders through events, workshops, matchmaking activities.

Prague Innovation Institute is the only innovation center in the country focused on advancement of education, as it realises importance of education for innovation. They cooperate with schools at every level of the educational system, raising awareness among school directors and teachers about the industry needs, importance of innovation and of entrepreneurship skills. The Institute supports the adoption of modern technologies in education, energy industry, sustainable development and waste management.

In addition, the Institute runs a business incubator (Enterprise and Innovation Center) to support start-ups and spin-offs, which also serves as a meeting place for for researchers and professionals from public administration, non-profits, and business.

For many years, the policymakers in Prague did not see the need to create a multi-functional organisation that would focus on connecting the education, business and innovation stakeholders and would foster collaboration between them. However, as the innovation ecosystem in Prague has been expanding, becoming more fragmented, and the innovation stakeholders were faced with multiple challenges, the government decided to establish Praha Inovační.

The success of the Institute is attributed to several factors:

- Due to engagement with various stakeholders, the Institute understand their needs and complexities associated with their collaboration. Thus, it is best positioned to propose effective collaboration models for them;
- The Institute acts as an adviser to the policymakers. The insights about the needs, challenges of different stakeholders and potential solutions are passed to the policymakers to design effective policy instruments;
- Prague Innovation Institute effectively uses soft instruments (i.e, discussion forums) to facilitate collaboration between the stakeholders, due to high professionalism of its staff;

- Due to multi-functional purposes of the Institute, it serves as a one-stop-shop for education, business and innovation stakeholders.

The Plastics Innovation Centre 4.0 (PIC 4.0) is the facility in the region of Koln that represents a completely interconnected research and development environment occupying a total area of 4,205 m^2.[1] It has been funded jointly by the North Rhine Westphalia state and the European Regional Development Fund.

The establishment of the Plastics Innovation Centre 4.0 aims to advance in the field of digitisation in plastics processing and to become one of the world leaders in the industry.[2] Besides expanding the innovation capabilities of the German plastic processing industry, PIC 4.0 also aims to provide specific skills to workers employed in the sector.

Success factors of the project include:

- Implementation of digital technologies and high-end assistance systems in production, fostering the benefits of digitization and automation with a state-of-the-art Smart Factory in Industry 4.0.
- The centre and its operations build on the local capabilities of the region and work together with local organizations. This way it contributes to the cluster of excellence.
- The Centre serves as a demonstration platform to present real-world solutions of future oriented research topics. Thus, it contributes to the region's reputation and competitivity.[3]
- Cooperation with the Aachen University supports the transfer of knowledge, research results into industries and attracts students to the field of Plastics Industry 4.0.[4]

The discussions with the experts highlighted an interesting observation. In our sample, the less developed regions typically have a less collaborative culture. This prevents the development of entrepreneurship and STI partnership, making discussions/negotiations

[1] https://www.ikv-aachen.de/en/research/pic-40/

[2] https://www.tpe-forum.de/ikv-approval-to-build-new-plastics-innovation-centre-4-0/

[3] https://en.kunststoffe.de/a/specialistarticle/the-pic-40-as-part-of-the-internet-of-pr-316298

[4] https://www.compositesworld.com/news/institute-for-plastics-processing-at-rwth-aachen-university-to-build-smart-factory-

problematic at all levels. The education sector in several less developed regions is already trying to tackle this by stimulating group work in classes, launching projects that focus on the development of social skills.