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The policy approaches towards innovative job creation vary, depending on the levels of economic development of a region

The innovative job creation effect is driven by organisations/industries that adopt automation technologies. The magnitude of the job creation effect is, first and foremost, dependent on the levels of economic activity in a region, and, second, on the intensity of technological transformation or innovation. Nevertheless, it is important to point out that depending on characteristics of adopted technologies and on how they are managed, the job creation effect in less developed economies might be higher than in more developed ones. This will be elaborated below, but in general, the case studies confirm that the innovative job creation effect is stronger in regions characterised by larger, more developed and dynamic economies, with higher GDP per capita.

As a result, there are cyclical, reinforcing relationships between technology adoption/innovation, economic development and job creation, as more developed economies continuously invest resources in innovation, thereby becoming more innovative. These relationships lead to deeper inequalities between more and less innovative and economically developed regions. Geographical disparities also occur within the same region, as the centres of economic and innovation activity pull human, financial and other resources, including from economically peripheral regions/areas.

The analysis of the case studies revealed some patterns in effective policy approaches followed by regions to stimulate innovative job creation at different levels of economic development and innovation (i.e., given different levels of availability/access to resources, scale and maturity of economic sectors and of the STI landscape). These approaches reflect that regional/national strategies on innovation and economic development are inextricably linked to innovative job creation. In most strategy documents, job creation itself is not considered a policy goal, but rather a natural consequence of economic development and innovation.

Overall, these policy approaches focus on stimulating the following dimensions:

- Innovation in prioritised economic sectors (e.g., advanced manufacturing, professional service sectors);
- Digitisation and IT sector development;
- Entrepreneurship.

Most examined regions focus on all three dimensions simultaneously, but to different degrees.

Below are presented three generalised types of regions and their corresponding successful policy approaches on innovative job creation. The names of these types of regions have been appropriated from Eurostat, which assigns a type based on the GDP per capita in purchasing power standards (PPS).

The table below summarises their approaches, followed by a more elaborate discussion.

Type of regions	**More developed regions**	**Transition regions**	**Less developed regions**
Availability of resources, scale and maturity of economic sectors and of the STI landscape	High	Moderate	Low
Key economic drivers of innovative job creation	Innovation in advanced manufacturing, professional service sectors	Digitisation and IT sector development, and several moderately developed industries	Entrepreneurship, digitisation and IT sector development
Sector driving innovative job creation	Mostly private sector	Private & public sector	Mostly public sector
Key feature of economic policies	Significant investments in R&D&I	Internationalisation; Investments in several key industries that drive the economy and innovation	Regulatory frameworks for ease of doing business; Education sector investments; Investments in one or several key industries that will drive the economy and innovation
Key instruments of policymakers	Industrial clusters	Business and innovation hubs	SME/start-up financial instruments, business hubs
Extent of the innovation job creation effect	High	Moderate	Moderate
Sectors with highest innovative job creation effect	Sectors that received highest innovation. However, there is a significant indirect job	IT and associated sectors	IT, associated or targeted sectors; might not have a strong sectoral focus

	creation effect on many other sectors		
Availability of labour	Large pool of labour resources	Moderate pool of labour resources	Moderate/low pool of labour resources
Key labour market challenge associated with technological transformation	Labour shortages across all skills levels due to growing economy	Significant labour shortages of highly-skilled workers	Significant labour shortages of highly-skilled workers

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Type #1: More developed regions

More developed regions, characterised by high levels of GDP per capita and high levels of innovation, generally have strong manufacturing sectors that are pushing the boundaries of industrial technological change, and have a (large) service sector focuses on high-skilled professional, technical and other business services. In these regions, generally, the development of the advanced manufacturing sector and innovation are the policy priority, as they serve as drivers of the economy, thereby stimulating diversification of economic activities. Most innovation in such regions is performed by the private sector. Hence, policymakers try to facilitate innovation through the development of industrial clusters, parks and investments in STI.

Digitisation and IT sector development in such regions is ongoing, although it is considered a part of Industry 3.0. Thus, it deserves less attention of the policymakers. The business and investment climate in such regions is typically favourable, and there are many business opportunities, given a large, dynamic and developed economy. Thus, the entrepreneurship ecosystem is buoyant. Entrepreneurship policies in such regions focus on stimulating highly innovative activities that will support the development of advanced manufacturing sector. Across all case studies, it has been highlighted by interviewees that start-ups are the best engines for testing disruptive innovation.

In view of the above, the innovation job creation effect in more developed economies is, generally, high across all skills levels. The growing advanced manufacturing sector and supporting service sector, powered by automation technologies, are generating many job opportunities for highly-skilled workers. In addition, innovative start-ups also contribute to creation of jobs for the highly-skilled. The innovative job creation effect might be small at the start, but the deployment of the start-up activities in developed economies may generate many new jobs.

In addition, the overall economic growth and diversification of economic activities in developed economies also stimulates the creation of low/middle-skilled jobs. This leads to labour shortages across all skills levels, attracting migrant workers with different skills sets. However, most acute labour shortages are among highly skilled occupations, such as IT professionals, engineers, doctors/medical staff etc. Among the conducted case studies, the above description strongly reflects the case of the Koln region, where Industry 4.0 has increased labour productivity, led to higher economic growth and increased the demand for labour at all skills levels.

The more developed regions are in a privileged position, as they may capitalise on accumulated resources and may enjoy some progress without continuous policy stimulus. Overall, this type of regions has significant resources to implement a variety of measures that provide extensive support for innovative job creation.

Type #2: Transition regions

The transition regions, characterised by moderate levels of economic development and innovation, typically have a multi-dimensional approach to innovative job creation. They are strongly investing in the development of their economies, as well as, gradually increasing the focus on innovation. Such regions typically invest in the development of several industries or professional service sectors, trying to diversify economic activities, and, simultaneously, develop economic specialisations. The prioritised or most developed industries are expected to become the catalyst of innovation and of economy. Thus, the aim of the policymakers is to successfully identify such industries/sectors and ensure their development.

Based on the case studies, the development of the IT sector in transition regions is considered strategic, as it has potential to transform existing industries/services, encourage further technological transformation, increase productivity and give rise to new associated industries (e.g., med-tech, green-tech, ed-tech). In several countries, the development of the IT sector has been strongly pushed by digitisation of the public sector. In essence, the public sector has become the main client of the local IT companies to stimulate their development.

Given a limited size of the local market in transition regions, they have a strong focus on internationalisation. The internationalisation efforts included attraction of the foreign direct investment (FDI) and/or the export of good and services abroad. Overall, internationalisation has proved to be an effective mechanism for stimulating economic development, innovation and job creation. Foreign investments foster new employment opportunities, expertise for innovation and the R&D sector, thereby expanding the innovative job creation effect. Meanwhile, internationalisation and trade exposure stimulate technological transformation of local companies, as they aim to increase their competitiveness.

The development of the entrepreneurial ecosystem is also highly important for the transition regions to satisfy their multi-dimensional economic ambitions. Thus, they have a strong focus on improving conditions for doing business, both for local and foreign companies, offering preferential economic zones, tax regimes, access to cheap labour, removing administrative barriers etc. The development of the entrepreneurial ecosystem and internationalisation require strong marketing/promotion activities of regional economic/innovation opportunities to boost confidence of entrepreneurs and investors. Among the examined case studies, such activities have been successfully conducted in Estonia, as the government focused on branding the country as a hub for digitisation and ICT in the EU.

Overall, public and private partnerships are common in such regions, as the government tries to encourage the development and innovation across economic sectors. Among its key instruments of support to the private sector are the business/innovation hubs (e.g., business incubators, accelerators) that support business and innovation ecosystems.

In view of the above, innovative job creation in transition regions is more expressive in the IT sector and in the associated industry/service sectors. As a result, these regions experience a significant shortage of highly skilled labour, particularly in the IT sector. Due to internationalisation, mastering a foreign language and having good communication skills became vital, once again reflecting the need for highly skilled labour.

Type #3: Less developed regions

These regions are characterised by lower levels of economic activity, smaller and less innovative industries and a dominating service sector. Thus, they are considered peripheries. As discussed earlier, the job creation effect is, first and foremost, dependent on the levels of economic activity in a region, and only then, on the intensity of technological transformation or innovation. As these are regions with fewer and smaller firms, policymakers have prioritised the development of the entrepreneurial ecosystem, supporting start-ups and SMEs with both high and low value added across all sectors through financial instruments and business hubs. Business hubs are relatively small in these regions, therefore the public sector also needs to invest in their development.

Most of these regions elaborate a smart specialisation strategy to develop business/industrial ecosystems around them, and prioritise one or several economic industries/sectors considered in the strategy. This is a similar approach as in the transition regions, however, due to their limited resources, and weaker industrial ecosystem, the number of prioritised industries/sectors and their deployment is much smaller. The allocation of resources for R&D&I in both public and private sector is low, due to limited financial resources, therefore their efforts should focus on attracting the FDI.

Like in transition regions, the IT sector development and digitisation are also of utmost importance to the less developed regions, given their transformative potential for other industries and service sectors. The key challenge for both the development of the IT sector and for the development of higher value-added sectors is a lack of highly-skilled labour. Given their low attractiveness to highly-skilled migrants, the less developed regions introduce reforms in their education/training systems, thereby investing in human capital. It is important to stress that all types of regions recognise the importance of education/training sector and introduce reforms to prepare their labour market to the future. However, for the development of economies in the less developed regions, investment in human capital is the first key step.

In view of low levels of economic activity and private investment in these regions, the public sector actively spurs local economies. Among its key instruments is the improvement of the regulatory framework for doing business and for investment. This includes facilitation of administrative procedures, financial preferences for entrepreneurs and investors. In addition, the policymakers invest in the development of business hubs to support local entrepreneurs.

Based on their economic strategies, the highest job creation effect in such regions is highest in the IT sector, in industries/sectors that are connected to the IT sector and/or in those that are prioritised by the policymakers. However, given a general attention to entrepreneurship, the innovation job creation effect might not have a strong sectoral focus.