ISSN 2449-9781
NR 22
(2022)
BIBLIOTEKA REGIONALISTY
REGIONAL JOURNAL

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Regional Differentiation of the Innovative Potential of Enterprises in the Czech Republic

Regionalne zróżnicowanie potencjału innowacyjnego przedsiębiorstw w Czechach

DOI: 10.15611/br.2022.1.01
JEL Classification: O31, O18, R11

Quote as: Hlaváček, P., and Mata, M. (2022). Regional differentiation of the innovative potential of enterprises in the Czech Republic. *Biblioteka Regionalisty. Regional Journal*, (22).

Abstract: This article presents the results of a survey of innovative activities of enterprises in the Czech Republic and a comparison of differences between regions. The goal is to analyse the approach of companies, examine how they evaluate their innovation activities and the implementation of R&D, and find out if there are inter-regional differences in the innovation activities of companies in chosen categories. The data were collected via a questionnaire survey of companies across regions in coordination with the Technology Agency of the Czech Republic. The research revealed that more enterprises were in a dependent position, providing partial functions within the concern, or as suppliers in their respective production chains. At the same time, companies are actively preparing for the constantly changing production and economic environment and some also have ambitions to become pioneers of innovative change. Even at regional level, some differences were found, given the different stage of development and competitiveness of the regions. Through the priorities of regional innovation

strategies, public support should prepare suitable conditions for the development of new industrial and tertiary sectors in the region.

Keywords: innovation potential, region, Czechia.

Streszczenie: W artykule przedstawiono wyniki badania działalności innowacyjnej przedsiębiorstw w Republice Czeskiej oraz porównano różnice między regionami. Celem jest analiza postaw przedsiębiorstw, sposobu oceny ich działalności innowacyjnej oraz realizacji działań badawczo-rozwojowych, a także ustalenie, czy w wybranych aspektach występują międzyregionalne różnice w działalności innowacyjnej przedsiębiorstw. Dane zebrano za pośrednictwem ankiety przeprowadzonej wśród przedsiębiorstw w badanych regionach we współpracy z Agencją Technologiczną Republiki Czeskiej. Badanie wykazało, że więcej firm znajdowało się w pozycji zależnej, pełniąc częściowe funkcje w grupie lub jako dostawcy w łańcuchach produkcyjnych. Z drugiej strony firmy aktywnie przygotowują się do zmieniającego się otoczenia produkcyjnego i gospodarczego, niektóre mają nawet ambicję zostania pionierami innowacyjnych zmian. Nawet na szczeblu regionalnym stwierdzono pewne dysproporcje, biorąc pod uwagę różne poziomy rozwoju i konkurencyjności regionów. Wsparcie publiczne powinno, poprzez priorytety regionalnych strategii innowacyjnych, przygotować odpowiednie warunki do rozwoju nowych sektorów przemysłowych i usługowych regionu.

Słowa kluczowe: potencjał innowacyjny, region, Czechy.

1. Introduction

For businesses, knowledge and innovation prove to be the key elements for increasing their competitiveness, e.g. new communication and information technologies are introduced and distribution channels and production technology are modernised (Palazzeschi et al., 2018), which leads to an overall improvement in all of their business activities. Among the introduced measures, innovation (Cowling, 2016) is especially important to maintain the future competitiveness of businesses, even more so in an environment of globalised competition. According to Pitra (2006), in order to achieve a higher level of competitiveness, companies should innovate business processes by making changes in the internal workings of the organization as well as their market presence. The fact that the presence of innovative companies in the region helps to develop the region itself is also evident. For innovating companies, their size and/or their ownership is no longer important, instead the initiation of the innovation development carries great importance and can come even from the cooperating subjects of individual companies. Dundon (2002) also mentioned that innovative activities in companies lead to profitability and growth of added value, which strengthens the competitiveness of not only companies, but indirectly boosts the performance of the regional innovation system.

The innovation system in the region includes a whole range of participants, institutional parameters and cooperation links, which is determined by the nature of the regional economy and other regional participants. The regional innovation system (Blažek & Csank, 2015) forms the environment in the regions in which businesses operate and is then perceived as an incubator of knowledge and

innovation, which is a fundamental element for strengthening the processes of creation, absorption and dissemination of innovation in the region.

In the innovation ecosystem, companies have a very important position with their innovation performance and the prerequisites for their further innovative growth, while their innovation potential can also be strengthened by mutual cooperation between regional participants from both the corporate and public sectors. The relations of all subjects should enable the sharing of capital, knowledge and resources, and their links should be intensive and interactive (Todtling & Trippl, 2005). The advantage of regional cooperation is the aid in communication through spatial proximity, which allows the implicit knowledge to spread more quickly (Doloreux & Parto, 2002). The strengthening of the regional innovation system is directly dependent on the innovation performance and ambitions of businesses in the region, large corporations (Sucháček et al., 2017) and small businesses (Beyon et al., 2021; Lewandowska & Stopa, 2018; Malecki, 2011). The development of regions in innovative areas are also related to the funds allocated for research and development activities, as it is an important prerequisite for the concentration of knowledge in the region (Žítek & Klímová, 2016). Another important aspect is the presence of scientific and technical infrastructure in the region, which helps to establish relations between all actors in the regions, and at the same time supports innovative business and innovation culture. Public policy and programmes that finance the R&D activities of companies play a significant role in supporting innovation (Wolfe, 2000). Setting up a system of public support for the innovation performance of enterprises (North et al., 2001) requires very specific information about the said enterprises, their innovation activities and growth expectations. The goal is therefore to analyse the approach of companies, how they evaluate their innovation activities and the implementation of research and development activities. Knowledge of this soft information is critical for the correct setting of public support, which requires the implementation of qualitative surveys among regional players. Only such methods can reveal unique data about the innovative environment and behaviour of companies.

2. Methodology and survey set characteristics

The research is based on a survey in which a total of 452 companies in the Czech Republic took part. Innovation centres with the support of the Technology Agency of the Czech Republic, the government agency CzechInvest, and in some cases also regional authorities, collaborated on the investigation and information gathering in the regions. The survey was based on the unified methodology of the INKA project by the Czech Technology Agency, which methodically preserved the continuity and mutual integrity of the information obtained during the survey.

The mapping the development of the innovation potential and the perception of enterprises follows the Regional Innovation Strategies of the Czech regions. Direct

interviews with representatives of company management led to the acquisition of information not only about the innovative performance of companies and R&D activities, but also, based on the summarised data, to the possibility of comparing the differences in the innovative and scientific research performance of companies in the Ústí region with other regions. The result is a comparison of all these regions, finding out the differences in the statements of businesses at regional level in the evaluated areas.

The collected data were further used to calculate an aggregate innovation index (Agr. Index), and indicators were assigned values (from 1 to 5), according to the importance of the categories. In a later section, the results from the qualitative research were correlated with the economic performance of the regions using the indicators GDP per capita and investment per capita in the region to see how the innovation activities of enterprises are linked to the economic performance of the regions.

The division according to ownership of the participating companies shows that in most regions of Czechia, the share of Czech companies prevails over companies with foreign owners (Figure 1). The regions with the prevailing share of enterprises with foreign owners are: the Plzeň region, the Moravian-Silesian region and Prague (as a separate metropolitan region). However, in terms of the share of foreign companies, most regions are above the average value for the entire Czech Republic, with the remainder being mixed ownership enterprises.

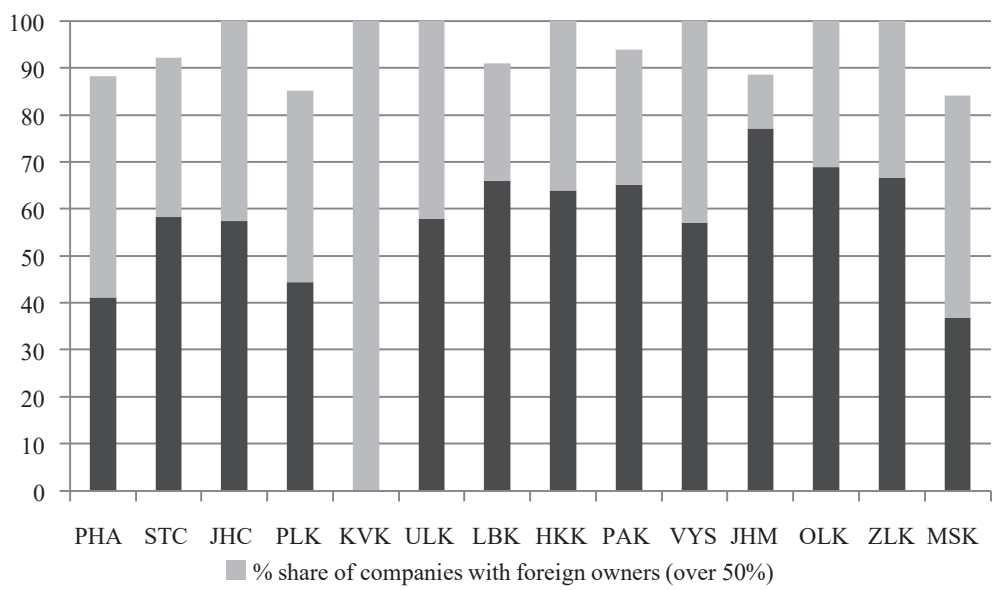

Fig. 1. Companies divided by geographical ownership (in %)

Source: author's graph based on data acquired from TAČR INKA II.

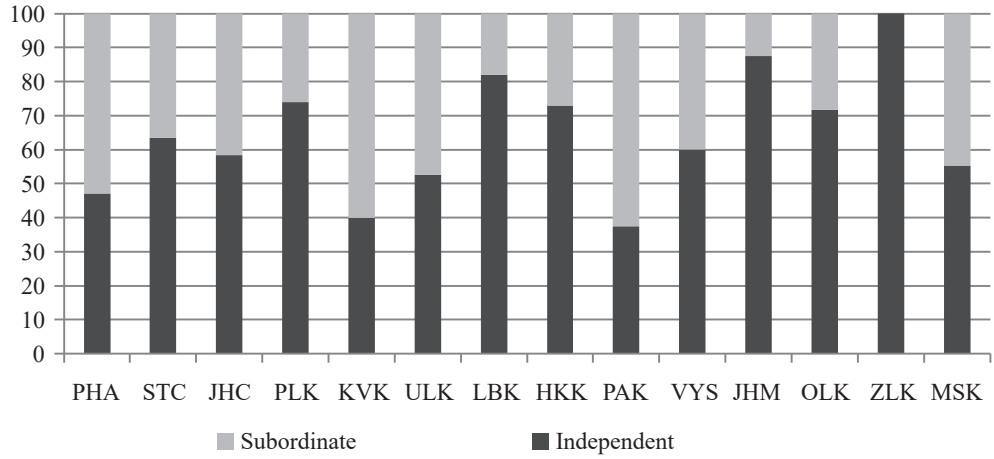

Fig. 2. Position in the group division by R&D activities (in %)

Source: author's graph based on data acquired from TAČR INKA II.

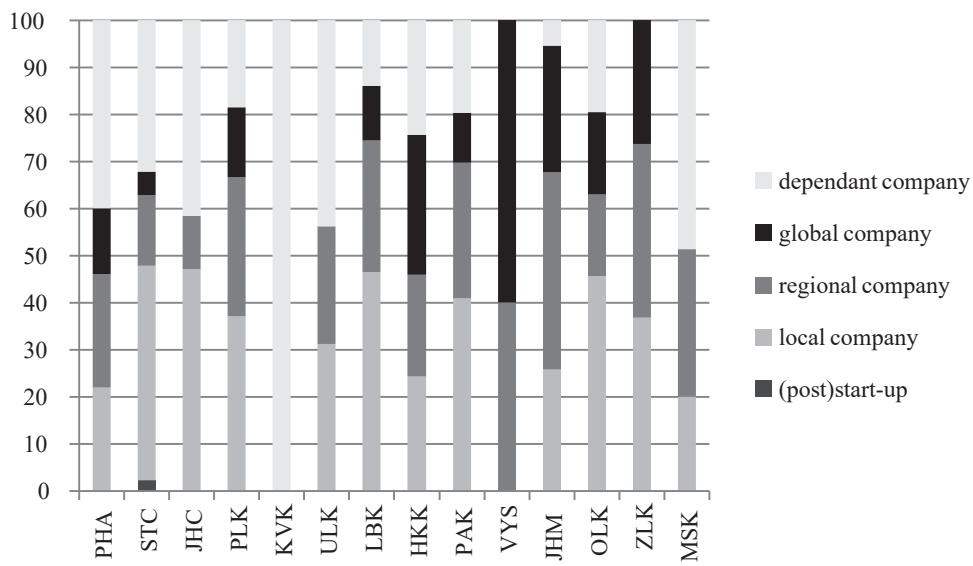

Fig. 3. Geographical status of companies (in %)

Source: author's graph based on data acquired from TAČR INKA II.

The analysed group of companies is thus differentiated according to the company's position in the distribution of R&D activities. In these companies, an independent role prevails within the group division and hierarchy of R&D activities (see Figure 2). In the Plzeň, Liberec, Hradec Králové, South

Moravian, Olomouc and Zlín regions, the number of Czech companies is above the average of Czechia as a whole. The subordinate role predominates in companies from the Karlovy Vary and Pardubice regions.

Regarding the geographical scope of the companies, the smallest share of companies in the (post)startup phase is located in the Central Bohemian region, whilst a significant percentage of companies in almost all the regions are the so-called local companies that operate only in the region (see Figure 3). Local companies were not found in two of the regions – Karlovy Vary and Vysočina, as regional and global companies are located here at the ratio of 40:60. Compared to other regions, more companies were in a more dependent position, providing secondary services within their concerns. Companies are also actively preparing for changes in the production and economic climate, some even have ambitions to become pioneers in innovative changes. Finally, global companies are fairly prevalent in the Hradec Králové, South Moravian and Zlín regions.

3. Results

During the research, it was found that most companies carry out R&D activities beyond the scope of their customer contracts (Figure 4). The highest share of such companies is in the Karlovy Vary region, as well as in Zlín, Prague, Pardubice, Liberec, South Moravian, Olomouc and Moravian-Silesian regions. The share of the companies from these regions are above the average for the entire Czechia. The second most frequent category among the companies are those whose R&D activities are part of the customer contract. In this category, there is an above-average ratio in the Liberec, Hradec Králové, Pardubice, South Moravian and Olomouc regions.

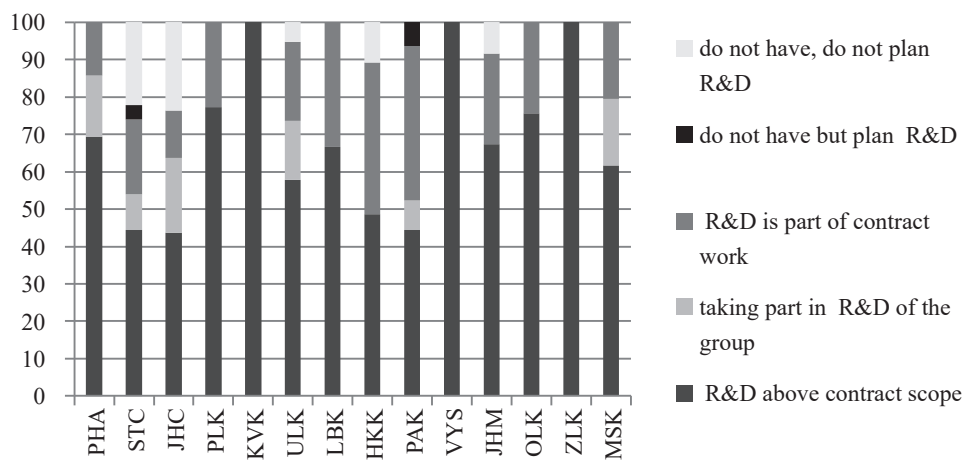

Fig. 4. Internal R&D activities (in %)

Source: author's graph based on data acquired from TAČR INKA II.

The businesses were also questioned as to how much their R&D budgets increased in the past three years. It was discovered that in most cases, companies did not increase their R&D spend. The second most frequent category were companies that increased their R&D spend by less than 10%. This category was dominated by companies from the Vysočina, Ústí, Pardubice, Olomouc and Moravian-Silesian regions, while companies that reduced their expenditure are present solely in the Central Bohemian region and Prague. R&D spend increased by more than 50% for companies in Prague, in the Central Bohemian, South Bohemian, Ústí, Moravian--Silesian and Plzeň regions, where the share of these companies was the highest in the given category (see Figure 5).

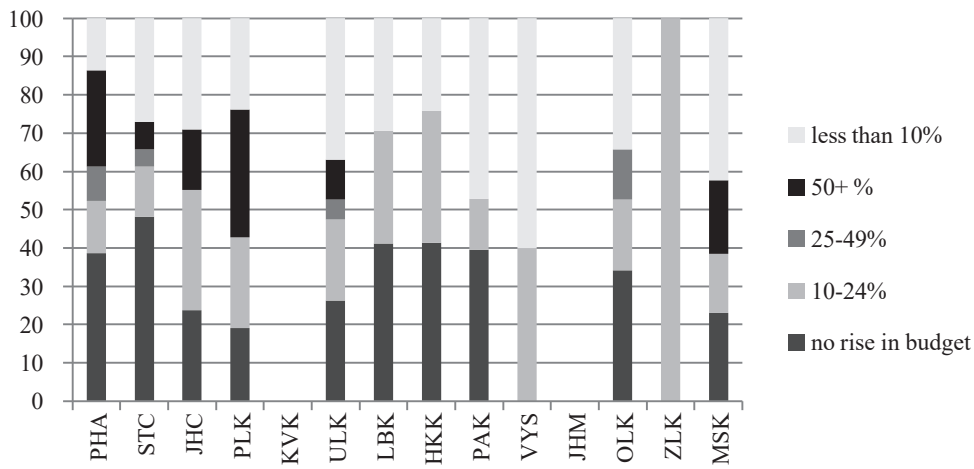

Fig. 5. Changes to budgets for R&D in the past 3 years (in %)

Source: author's graph based on data acquired from TAČR INKA II.

The companies' estimation of their own development phase can be seen in Figure 5. In almost all the regions of the Czech Republic, companies are mostly expanding. The share in most regions exceeded the average for Czechia as a whole. The second most common phase that businesses are currently undergoing is the stabilisation phase, most prevalent among companies in the Zlín and Ústí regions. There are significantly fewer companies in the defensive (consolidation) and diversification phases. The (post)startup companies are present only in the Central Bohemian region.

Figure 6 shows that most companies are actively preparing for the future shape or changes of their markets. In Prague, almost 30% of companies indicated such changes or trends, and the situation is similar in the Vysočina region. Businesses in the Ústí and the Moravian-Silesian regions have a similar distribution of orientation towards the future. Approximately 20-25% of companies from both regions are trying to see their future direction, and around 75% of companies are actively preparing for the future shape and changes of their markets. A certain lack of interest in the future

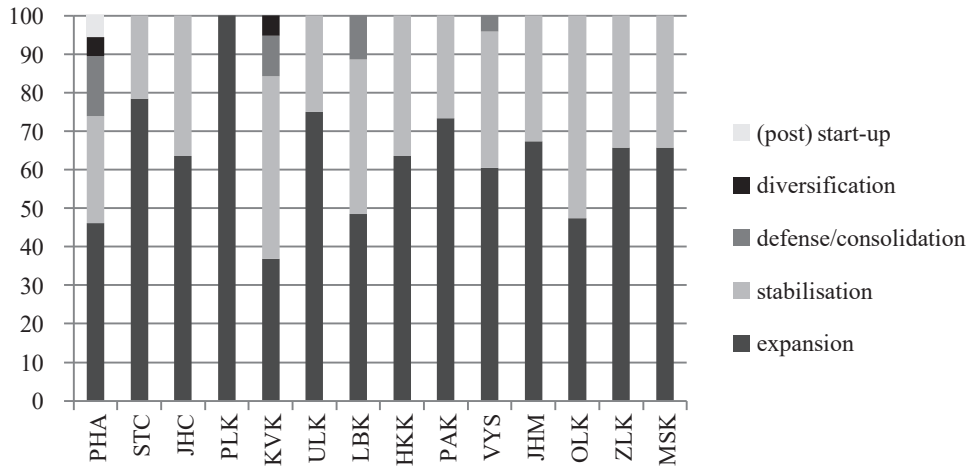

Fig. 6. Phase of development of surveyed companies (in %)

Source: author's graph based on data acquired from TAČR INKA II.

was noted among companies in the Central Bohemian, Liberec and Hradec Králové regions. In all three regions, this amounts to a quarter of all the companies operating in the region.

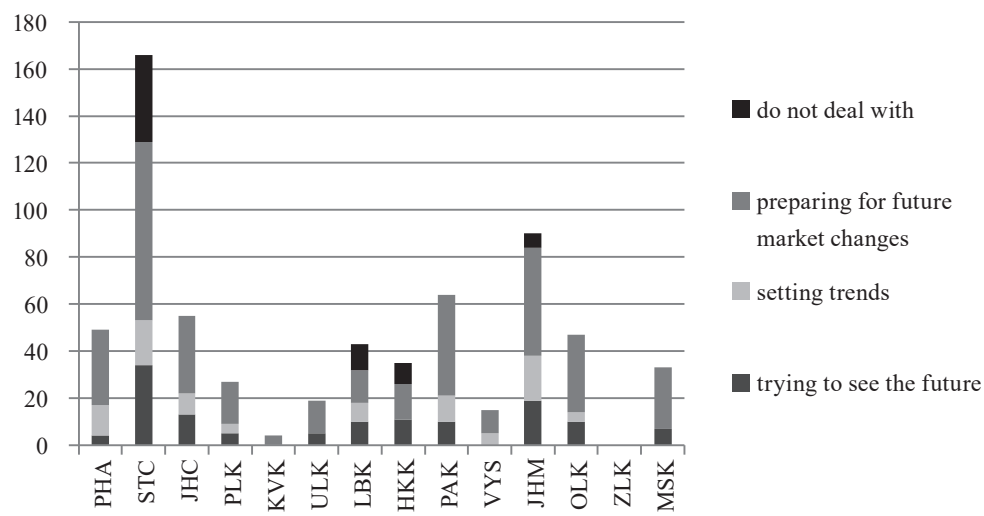

Fig. 7. Perceived position of the company on the market (abs.)

Source: author's graph based on data acquired from TAČR INKA II.

There is not a large number of leaders in technology among companies in Czechia (Figure 7), they are only present in some of the Czech regions and their share in the total number of companies is very small. In Hradec Králové and Olomouc regions, this share is around 15% of the companies within the region. A higher number of technological leaders is found in the Moravian-Silesian, South Moravian, Pardubice, Liberec, Ústí and Central Bohemian regions. Companies in the position of trend followers and specialised affiliates are more common. The distribution of these two positions of companies in these regions is often close to 50:50. Companies which are considered pioneers in the Zlín, Ústí, South Moravian Region, the Vysočina Region and Prague also make up a significant percentage. In the Central Bohemian and South Bohemian regions, a significant share of companies can be referred to as foreign technology adopters. The share in these two regions is around 30%, which is above the average for the entire Czechia.

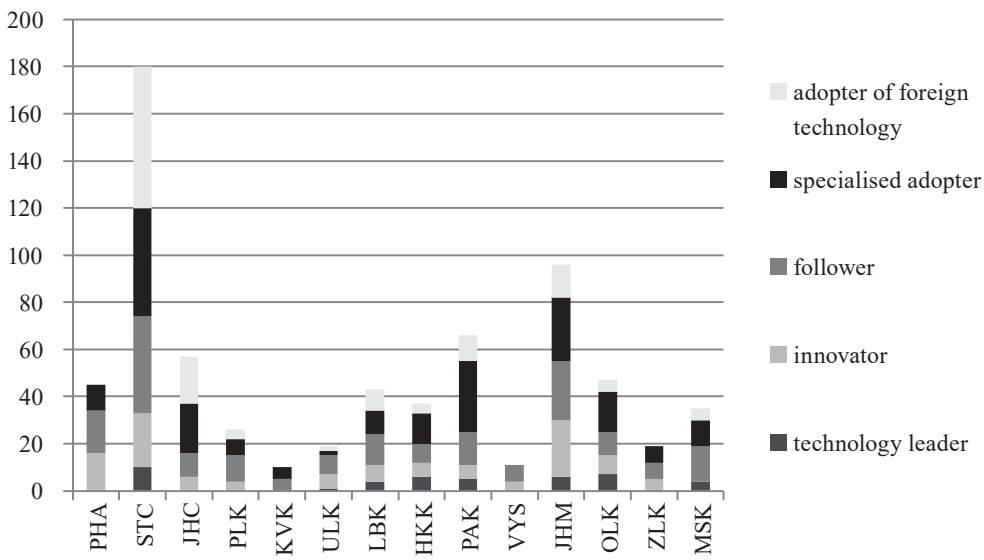

Fig. 8. Technological position of the company on the market (abs.)

Source: author's graph based on data acquired from TAČR INKA II.

Table 1. Correlation between innovation activities of enterprises and economic performance of regions

Indicator		Technol MarketPosit	RD position	RD cost	Agr. Index	GDP perCapita	Invest perCapita
TechnolMarket Posit	Pearson Correlation	1	−.376	.249	.327	.458	.393
	Sig. (2-tailed)		.186	.390	.254	.099	.165
RDposition	Pearson Correlation	−.376	1	.104	.375	.044	.067
	Sig. (2-tailed)	.186		.723	.186	.881	.820

RDcost	Pearson Correlation	.249	.104	1	.931*	−.095	−.307
	Sig. (2-tailed)	.390	.723		.000	.748	.285
Agr. Index	Pearson Correlation	.327	.375	.931*	1	.062	−.122
	Sig. (2-tailed)	.254	.186	.000		.833	.678
GDPperCapita	Pearson Correlation	.458	.044	−.095	.062	1	.965*
	Sig. (2-tailed)	.099	.881	.748	.833		.000
InvestperCapita	Pearson Correlation	.393	.067	−.307	−.122	.965*	1
	Sig. (2-tailed)	.165	.820	.285	.678	.000	

* correlation is significant at the 0.01 level (2-tailed)

Source: author's graph based on data acquired from TAČR INKA II. and Czech Statistical Office.

In most regions there is a prevalence of companies referred to as pioneers in terms of leadership in technological advancement. Such businesses can be found in almost every region of the Czech Republic except for the Vysočina region, where 100% of companies are labelled as leaders. Still, other leading companies can be also found in the Plzeň, South Bohemian, South Moravian, Zlín, Olomouc and other regions.

In the Central Bohemian and Ústí regions, businesses considered to be followers are most prevalent. The designation of being an optimizer is prominent among companies in the Hradec Králové region, and a significant share of these companies is also found in the Liberec and Central Bohemian regions.

Selected findings of the survey were further compared with selected indicators of regional economic performance (GDP per capita and gross investment per capita). The data indicated a statistically significant dependence at the 99% confidence level only between macroeconomic indicators, specifically between the level of GDP and investment per capita. For the subjects researched in the area of innovation and the development activities of enterprises in the regions, a statistically significant dependence was only found between the level of innovation and development expenditure and the aggregate index of innovation activities. There was no dependence between macroeconomic indicators and the innovation activities of enterprises.

4. Discussion and conclusions

The survey central to the research provided information on the approach of a selected group of companies across regions and the differences between the regions in the innovation activities. The research revealed that the examined companies in the structurally affected regions do not completely fall behind companies from other regions in Czechia. According to the results, they do have some innovation potential,

even if they sit at the lower levels of the value chain instead of higher positions, such as producers of the final product. In many cases, these companies are not merely assembly lines, which would have partially or completely limited possibilities of providing funds for their own R&D activities if that was the case.

More companies from less developed regions were in a dependent position, providing partial functions within the group, compared to those from other regions. The analysis of innovation and R&D activities found that companies were also actively preparing for production changes and changes in the economic climate, and some even aspired to become pioneers in innovative advancements. They also received a higher number of contracts requiring research and development, such as improving the properties of their current products. When questioned about the main challenges that require a response, businesses answered that the changing regulatory and legislative frameworks had a rather significant impact on their business. Changes in customer preferences were also often mentioned, requiring changes in approach as well. Despite the relatively less significant share of companies with ambitions to achieve higher innovative growth and being perceived as innovators, the companies showed positive economic results in regard to the increased outputs and employment, remaining competitive even when compared to the results of other regions. There were not many technology leaders among Czech companies, and businesses regarded as followers, and specialised adopters were therefore much more frequent.

The development of the regional innovation system is directly dependent on the innovation performance and ambitions of the regions' enterprises. The regional differences identified by the research went beyond the regional dimension of the innovation climate and hinted at preexisting differences in the base economic infrastructure of individual regions in terms of the structure of the business sector. However, the research did not show a relation between the economic level of the region and the innovation activities of enterprises, which indirectly confirms the finding that enterprises from structurally disadvantaged regions may not lag significantly behind enterprises from more developed regions. Instead, further innovation growth is influenced by the degree of development of regional innovation systems in each region, hence the important role of regional governments in supporting their development.

Revisions of the regional innovation strategies in the regions and other supportive tools for the development of the innovation ecosystem in the region should also help with increasing innovation performance. Knowledge and skills, together with the active sharing of know-how between enterprises in the region is important for its overall competitive strength and increase of innovation performance (Doloreux & Parto, 2005).

The revitalization of economies in the regions and strengthening of their competitiveness (Hlaváček, 2016) should continue to increase development support of new industrial and tertiary sectors in the region, which in the context of other important and necessary economic and social change, places demands on the quality

of the workforce, the development of regional education systems and strengthening the knowledge base.

References

Beynon, M., Jones, P., & Pickernell, D. (2021). Innovation and the knowledge-base for entrepreneurship: Investigating SME Innovation across European regions using fsQCA. *Entrepreneurship and Regional Development*, *33*(3-4), 227-248.

Blažek, J., & Csank, P. (2015). Can emerging regional innovation strategies in less developed European regions bridge the main gaps in the innovation process? *Environment and Planning C: Government and Policy*, *34*(6), 1095-1114.

Cowling, M. (2016). You can lead a firm to R&D but can you make it innovate? UK evidence from SMEs. *Small Business Economics*, *46*(4), 565-577.

Doloreux, D., & Parto, S. (2005). *Regional innovation systems: Current discourse and unresolved issues*. Burlington: Ashgate.

Dundon, E. (2002). *The seeds of innovation: cultivating the synergy that fosters new ideas*. New York: AMACOM.

Hlaváček, P. (2016). Evaluation of competitiveness of regions on the example of the Czech Republic and Slovakia. *9th International Colloquium on Regional Sciences*, 65-73.

Lewandowska, A., & Stopa, M. (2018). SMEs innovativeness and institutional support system: local experiences in a qualitative perspective. A Polish case study. *Oeconomia Copernicana*, *9*(2), 333--351.

Malecki, E. J. (2011). Connecting local entrepreneurial ecosystems to global innovation networks: open innovation, double networks and knowledge integration*. International Journal of Entrepreneurship and Innovation Management*, *14*(1), 36-59.

North, D., Smallbone, D., & Vickers, I. (2001). Public Sector Support for Innovating SMEs. *Small Business Economics*, *16*(4), 303-317.

Palazzeschi, L., Bucci, O., & Di Fabio, A. (Ed.). (2018). *Re-thinking innovation in organizations in the Industry 4.0 scenario: new challenges in a primary prevention perspective*. https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00030/full

Pinto, H., Fernandez-Esquinas, M. I., & Uyarra, E. (2013). Universities and Knowledge-Intensive Business Services [KIBS] as sources of knowledge for innovative firms in peripheral regions. *Regional Studies*, *12*, 1-19.

Pitra, Z. (2006). *Management inovačních aktivit: Zbyněk Pitra*. Praha: Professional Publishing.

Sucháček, J., Seda, P., Friedrich V., & Koutský, J. (2017). Regional aspects of the development of largest enterprises in the Czech Republic. *Technological and Economic Development of Economy*, *23*(4), 649-666.

Todtling, F., & Trippl, M. (2005). *One size fits all? Towards a differentiated regional innovation policy approach.* Edward Elgar.

Wolfe, D. A. (2000). *Conference proceedings. Transition to the knowledge society: policies and strategies for individual participation and learning*. University of British Columbia Press.

Žítek, V., & Klímová, V. (2016). *Aplikace konceptu regionálních inovačních systémů a aplikace pro inovační politiku*. Masarykova univerzita.