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# Innovative development of small resort towns: the triad of science, business, and education

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Urban areas are places associated with the transformation of ideas into practices, social initiatives, and spatial economics. The study aims to assess the triad interaction between education, science, and business as a multiplier on the socio-economic development in the region. The study built a conceptual model of socio-economic space in the context of innovative urban development: the unity of education, science, and business. The statistical analysis allowed the author to substantiate the peculiarities of the local triad. The study revealed correlations in the influence of education, science, and business on changes in the regional system. The paper suggests that the triad of education, science, and business rests on territorial specifics. This feature is the determining factor of innovative development in the field of resort towns. The presented research uses the quantitatively measured influence of the triad as a multiplier by combining values of the unity of education, science, and business. The study found that the mentioned indicator reflects the wellbeing and quality of the labor resources in the region. On the one hand, the multiplicative influence of the triad is a guarantee of an increase in the wellbeing level within the borders of the region. On the other hand, it requires adaptation of the innovative development of resort towns to the current growth of the workforce and a decrease in innovative advantages on a local scale. The findings provide policymakers with significant indicators on the way to stabilizing the regional economy and effective decision-making. The study of the interaction between education, science, and business in the context of socioeconomic development can become a crucial tool for formulating policies aimed at stabilizing the region's economy and improving the quality of life of its residents, particularly in resort cities. The obtained results can provide guidelines for the development of innovation support programs and the planning of investment strategies, taking into account the specifics of territorial conditions.

## KEYWORDS

innovation management, knowledge society, resort area, small urban ecosystems, spatial economy, sustainable cities

## 1 Introduction

Currently, cities are facing the ongoing economic and political consequences of the conflict in Ukraine. These challenges are exacerbated by climate change effects, such as rising temperatures, drought, and intense storm activity (Kearney, 2023) and the recent public health crisis – the COVID-19 pandemic (Prawoto et al., 2020). Each of these factors has potentially serious side effects. For example, the economic consequences of the conflict in Ukraine continue

to affect local communities around the world: it causes increases in prices for food and fuel, disrupts supply chains, and deteriorates consumer sentiment. These outcomes damage the economy at both the micro and macro levels (Besser and Hanson, 2016; Kearney, 2023). In the context of deindustrialization, demilitarization, and changes in urban structure attributed to inefficient governance, the primary factor leading to the current decline of cities is the confluence of trends and deficiencies in management that have resulted in adverse changes in the urban environment. Addressing these issues may involve enhancing the urban governance system, implementing effective strategic planning, and promoting sustainable development. It is also crucial to actively involve the public in decision-making processes to ensure greater transparency and consideration of the needs of the local population (Jucu and Voiculescu, 2020). According to the findings of D. L. Hoffman and his colleagues, the survival of cities in contemporary conditions poses a highly challenging task. Key factors influencing this complexity include intense online competition, difficulties in hiring and retaining qualified personnel, and numerous governmental restrictions that necessitate adaptation and strategic planning for successful functioning (Hoffman et al., 2022). New approaches to leveraging old cultural peculiarities, especially through the lens of local perception, reveal the profound impact of traditional cultural elements on the lifestyle of the local population. Facilitating not only the preservation of ancient customs and traditions but also shaping a unique way of existence, these cultural features become a significant component of local identity. This can influence the perception of the locality as an attractive destination for tourists and investors, defining its unique character and creating potential for economic development (Ancuța and Jucu, 2023). Lopes Balsas (2023) believes that innovations in tourism resource management play a key role in improving the urban tourism experience and stimulating development. Digital technologies, smart systems, sustainable practices, and cultural innovations are effective in attracting more visitors. Personalized experiences, as well as environmental and creative solutions, make the image of a city unique, thereby increasing its competitiveness in the tourism market.

High-quality curricula in the field of tourism promote entrepreneurial initiatives and increase the competitiveness of a city. Such curricula provide students with in-depth knowledge, including the management of tourism enterprises and the use of innovation. International experience and multi-specialty programs expand the horizons of future entrepreneurs. Practical skills and internships provide preparation for the real challenges of the industry. Networking and exchange of experience create a favorable environment for the emergence and development of entrepreneurial ideas. All these measures form professionals able to effectively implement their tourism projects that develop a city and make it more attractive for tourists (Igwe et al., 2022).

Subhadip and Subhalaxmi (2023) assumed that environmental research plays an important role in the development and implementation of environmentally sustainable practices in cities. Environmental studies promote the efficient use of resources, waste management, and the development of green technologies and infrastructure. These studies also investigate the impact on the environment to provide sufficient data for making informed

decisions to minimize negative consequences. The environmentally sustainable practices introduced within environmental research considerably improve the environmental situation in cities. Moreover, successfully implemented practices make cities more attractive to environmentally conscious tourists, contributing to sustainable tourism.

Against the background of global economic changes, the indicators of the Canadian economy in 2022 were the highest in the G7 (Government of Canada, 2023). Canada is a country with a high level of economic development (World Bank, 2022) and entrepreneurial activity. Among 22 high-income countries (Level A) according to the criterion of 2022/2023, Canada ranks 2nd in the global entrepreneurship ranking by the level of general entrepreneurship among the population (Hill et al., 2023). Thus, economic and entrepreneurial growth in Canada, especially in times of crisis, was due to the involvement of businesses in the sectoral infrastructure of the economy and innovative practices. In this vein, cities are the driving force of economic activity (Bhattacharya et al., 2020), while innovation is a catalyst for creating jobs, strengthening the socio-economic system, increasing the wellbeing of the population, as well as environmental benefits (Kenny and Kilcrease, 2023). As noted by Bhattacharya et al. (2020) and Kenny and Kilcrease (2023), a key feature of the innovative development of towns is the intersection of competitiveness, capital, and sustainability in the context of the interrelationships of the innovation community subjects – government, private business, and citizens (Dincer and Acar, 2017). These innovative clusters within the boundaries of urban areas foster high-value-added activities (Appio et al., 2019). The decisive factor in the development of innovation activity is creative human capital, which serves as an accelerator in the formation and spread of the digital economy. Creative human capital encompasses the persistence of continuous education, the development of scientific progress, and the ability to independent entrepreneurship (Kolesnichenko et al., 2019). In this regard, the researchers conclude that the employment-to-population ratio can be a criterion for evaluating innovative development in Economy 4.0. This conclusion is consistent with the findings (Davis and Morais, 2004; MacCarthy and Ivanov, 2022). Economy 4.0 builds upon the platform of a knowledge society and the growth of digital information. Therefore, the researchers emphasize an urgent need for highly educated talents to support the innovative development of urban areas and new technological strategies (Fernandez-Anez et al., 2018). The main factors shaping the image of resort towns as attractive places to live, visit, and invest in are the quality of the natural and artificial environment; infrastructure; availability of leisure; human capital; popularization of the history of the city through the exchange of experience between the local community and guests (Fair, 2022). At the same time, the human capital factor is the most valuable resource of the city. It includes the talents of the local population; the level of education with a bachelor's degree or higher; and creative workers (Ivaldi et al., 2020; Polaris Market Research, 2021). Jucu (2012) also emphasizes the significance of education, asserting that its reform should be grounded in specific scientific research focused on the peculiarities of didactic-pedagogical characteristics, as well as on novel investigations.

The university campus opened in Sylvan Lake will provide education and support to local entrepreneurs, researchers, and students who want to contribute to the development of the region. This step will increase the demand for innovative approaches and practices, fostering the economy in the urban resort area of Sylvan Lake in the northern province of Canada, Alberta. However, Sylvan Lake, as a resort area, may face the effect of seasonality. This factor requires innovative methods aimed at stimulating the economic development of the spatial economy.

Within the national framework of the country, a resort city is a populated area that attracts residents and tourists due to its natural environment, recreational opportunities, therapeutic properties, and other factors conducive to relaxation and recovery. In turn, innovative development is an innovative way to solve the problems of socio-economic space (Tan and Taeihagh, 2020; Fair, 2022). Among the 10 provinces and three territories of Canada, Alberta abounds in towns. In total, there are 106 towns in Alberta (Directory of Government of Alberta Ministries, 2023). The main attractions of Alberta are the open spaces and proximity to nature. At the same time, the province is the center of the traditional extractive business and the sector of environmental and clean technologies (Kenny and Kilcrease, 2023). This fact is confirmed by data on the extractive industry, which accounted for 21.8% of Alberta's GDP (Statista Research Department, 2022), and by the business activity of owners-managers motivated to open a new business by 2025 (16.4% compared to 15.1% in the country) (Feinberg, 2023). The economy of Alberta focuses on the extractive industry and large businesses aimed at the most innovative approaches. This peculiarity slows down development; there is also a need for medium-sized businesses that seek to meet local demands. This business segment is a stable employer and creator of gross domestic product (Kenny and Kilcrease, 2023; Ressin, 2023). Consequently, the development of sound regional policies can improve general urban wellbeing. It strengthens the capacity of local and national entities to promote the sustainability of the entire economic system (Ivaldi et al., 2020). As noted by Kummitha and Crutzen (2017), the scientific literature presents two main approaches to the discussion of innovative urban development. First, the technology-driven method asserts that the introduction of an information environment (information and communication technology, ICT) into the economic activity of a local territory will improve living standards. Second, the people-driven method suggests that the use of ICT by communities will allow for active participation in the society of Economy 4.0. In this scenario, Nuralina et al. (2023) found that countries considering the digital development of territories as a priority have lower indicators of socio-economic space development. The researchers proved that in conditions of an unstable external environment, a balanced assessment is essential. It includes an analysis of indicators of both the digital economy and the sustainable development of the territory at the regional and national levels. This assessment supports the government's commitment to achieving global agendas and preventing the occurrence of imbalances within the entire economic system. As a result, the assessment integrates a set of social, economic, environmental, and digital indicators into a comprehensive index (Composite Country Development Index). This index focuses on economic efficiency, social justice,

and sustainable development of the country. The result obtained by the researchers revealed that currently, the digitalization level of the territory does not guarantee advantages. Therefore, policy measures should focus on reducing the gap between the indicators of a sustainable economy to increase digital potential in an economy 4.0. Other researchers, for instance, Bhattacharya et al. (2020) concluded that the innovative development of the territory depends on the capabilities of the urban environment. To assess the innovative development of the city, the researchers propose to use a hierarchical analysis with several levels of indicators. This analysis reflects the socio-economic management of the territory, further combining them into the aggregate Smart Sustainable City Development Index (SSCDI). The proponents of innovative urban development (Abu-Rayash and Dincer, 2021) emphasize the importance of two areas that require improvements: socio-economic (economic efficiency) and energy areas (renewable energy sources for profit in environmentally friendly cities). The improvements in these indicators will foster the development of urban innovation. Thus, the researchers found that an increase in the index of environmentally friendly technologies by 25% doubles the smart city economy index. At the same time, an increase in GDP per capita by 50% leads to a moderate increase, respectively.

In the context of sustainable urban development, transportation infrastructure also plays a key role in ensuring economic activity and improving the quality of life of residents. Improving access to various modes of transportation contributes to business development, particularly in the tourism sector, and also helps reduce environmental burdens by alleviating traffic congestion and emissions of harmful substances. Thus, investments in the development of transportation infrastructure are an important factor in creating a sustainable and attractive environment for residents and tourists (Macioszek and Ahac, 2023; Macioszek and Jurdana, 2023; Macioszek, 2024).

Therefore, urban innovation depends on various aspects that encompass technological progress, socio-economic conditions, and organizational factors. The overall complexity of the urban environment determines its capacity for adaptation and the implementation of innovations. Changes in technologies and the information environment define opportunities for urban innovation. The advancement of modern technologies, such as the Internet of Things, artificial intelligence, and others, opens new possibilities for enhancing infrastructure, energy efficiency, and city management systems. The state of the economy, employment levels, access to education, and healthcare influence innovative activity. Urban innovations can be stimulated by economic development, contribute to social inclusion, and enhance the quality of residents' lives. The design and planning of urban spaces play a crucial role in creating a conducive environment for innovation. Zoning, the placement of infrastructure, and the development of green spaces can contribute to the creation and implementation of innovative solutions. The quality of urban governance and the interaction between different levels of authority are key factors for innovation. Flexible and transparent urban strategies facilitate rapid responses to challenges and opportunities.

The selection of resort cities as the subject of investigation is motivated by several key factors that delineate their distinctive role in the context of urban innovation. Specifically, the high

tourist potential of resort cities, grounded in their unique natural surroundings and historical heritage, renders them attractive subjects for the exploration and implementation of innovations in the tourism sector. Situated in appealing natural landscapes, these cities become focal points for the development of innovations in ecology, sustainable development, and nature conservation. The therapeutic and recreational resources inherent in resort cities endow them with a unique role in fostering innovations in the medical field and tourism. The economic impact of resort cities identifies them as pivotal players in regional economies, and innovations within them have the potential to stimulate the development of new sectors. The provision of residents' quality of life through the natural environment and recreational opportunities makes resort cities particularly intriguing for innovations aimed at preserving and enhancing these positive aspects. Choosing resort cities as the object of study opens opportunities for a deeper understanding and refinement of urban development, considering their unique characteristics and contribution to contemporary innovative practices.

Given the above, previous researchers mainly studied urban innovations and their assessment through the measurements of three areas: social, economic, and environmental. To this end, they employed complex and hierarchical approaches. The present study reduces the scale from a country and a city to a small urban resort area as a specific territorial form of geographical place having a distinctive size and priority activity. The study also assesses the changes in the regional system regarding urban innovations of small resorts and the unity formed by education, science, and business.

The novelty of the research is a local-scale quality assessment tool focused on a triadic approach to the analysis of innovative development in the context of education, science, and business. The delineation of three key aspects or elements forming a triad can be a strategic approach to a deeper understanding of urban innovation. This may involve identifying crucial interrelationships that help maximize the impact of innovations in the urban context. Such a focus can streamline the analysis and provide a clearer understanding of how specific aspects interact to drive innovative changes in cities. It is the key to developing an innovation management structure that provides an integrated and comprehensive understanding of socio-economic space development. The study aims to assess the influence of the triad interaction between education, science, and business as a multiplier on the socio-economic development in the region.

The territorial dimension of the issue is accentuated within the province of Alberta in Canada. In the context of the development of resort cities, Alberta stands out with a significant number of cities that attract tourists with their natural beauty and favorable conditions. However, the province's economy is focused on the extractive industry and large enterprises geared toward the most innovative approaches. This results in a lack of development of medium-sized enterprises that could meet local needs and create sustainable employment opportunities. The development of balanced regional policies can contribute to enhancing the overall

wellbeing of cities and strengthen the potential of local and national authorities in promoting the resilience of the economic system.

Research objectives:

1. Develop a conceptual model of the socio-economic system that reflects the innovative development of resort towns within the regional borders of Alberta in the context of Education, Science, and Business as a triad;
2. Substantiate the triad approach to the innovative development of resort towns regarding education, science, and business;
3. Assess the influence of the triad interaction between education, science, and business as a multiplier on the socio-economic development in the region.

*The structure of the article:* Section 1 presents a literature review, which substantiates the relevance of the studied practical problem. Section 2 describes the step-by-step activities of the study and the materials, which served as a basis for the study. Section 3 presents the findings. Section 4 compares the results with other similar studies. Section 5 summarizes the results of the study, outlines the possibilities of their practical application, and suggests the direction of further research.

## 2 Materials and methods

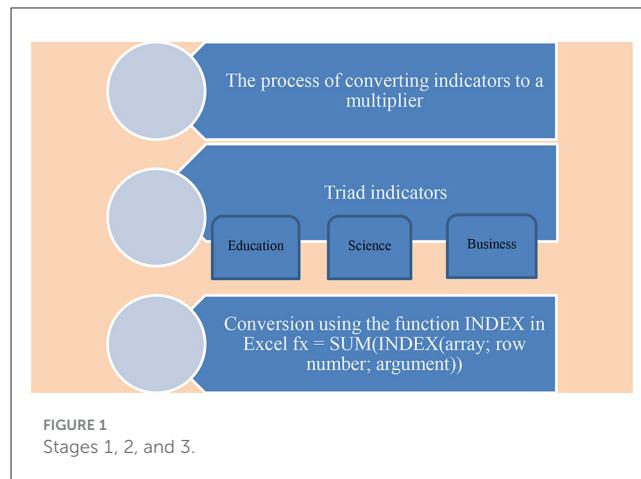
The research rests on a theoretical model that summarizes the innovative development of resort towns in the context of the regional economy regarding the triad interaction between education, science, and business. According to this methodology, the theoretical part uses the concepts of Fair (2022), Hutcheson and Legg (2022), and Kenny and Kilcrease (2023); the empirical part employs the statistics of Canada (Statistics Canada, 2023) and Alberta (Alberta Government, 2017; Office of Statistics and Information Alberta, 2023), including data collected for four resort towns: Banff, Jasper, Drumheller and Sylvan Lake (Government of Canada, 2022). The criterion of the analysis is a certain superiority of the Canadian economy in the global community. This country is capable of finding effective solutions to socio-economic problems in a short time against the background of global changes. The analysis uses the example of Alberta and resort towns: Banff, Jasper, Drumheller, and Sylvan Lake. The choice of Alberta is due to the abundance of towns (communities with a population of at least 1000 people) in the socio-economic space of the province (Directory of Government of Alberta Ministries, 2023). This includes resorts that meet the main directions of territorial development, such as (a) a natural environment with attractions; (b) available workplaces for the urban population; and (c) a central place for business activity. The analysis period covers 2016-2023. Methodological tools include the methods of collection, analysis, and generalization; statistical analysis; correlation. The study used Excel and Visio programs to summarize and interpret the obtained data. The descriptive statistics of the data included means, standard deviations, and other metrics for each of the indicators, such as the percentage of the population with higher education, the percentage of the population with doctoral degrees, as well as the level of entrepreneurship in the studied cities.

## 2.1 The research activity consists of three stages

*Stage 1:* The development of a conceptual model for displaying the innovative development of resort towns as a unity of education, science, and business regarding the regional economy of Canada. At this stage, the study employed the example of Alberta in the context of such resorts as Banff, Jasper, Drumheller, and Sylvan Lake. To construct the model, the authors used the method of collecting, analyzing, and generalizing scientific data (Fair, 2022; Hutcheson and Legg, 2022; Kenny and Kilcrease, 2023). In this context, the triad serves as a resource for innovative development created by covering the urban population with higher education; support for scientific activity; and the professional inclusion of science in innovative practice and business. As a result, the model visualizes a fragment of socio-economic reality, reflecting the relations and interrelations between subjects and objects of the economy at the local, regional, and national levels. The model also includes data on innovations in descriptive characteristics of the triad and global economic changes. The Visio program tool presented the result of the stage.

*Stage 2:* The substantiation of the measured triad values the context of resort towns. The stage uses the statistical analysis of the following indicators: the proportion of people with a bachelor's degree and above; the proportion of the urban population with a doctorate; the proportion of private entrepreneurs who are or are not a legal entity, as well as unpaid family workers; employment in corporate entrepreneurship, including with industry emphasis. The unit of analysis is an individual aged 15 years and older living in a private household (Government of Canada, 2022). An Excel histogram visualized the result. In addition to the calculations of statistical analysis, the study provides an overview of the regional labor market in corporate business management. It includes data on MBA program graduates and employers' demand for highly educated managerial talents with a bachelor's degree or higher (Statistics Canada, 2023). The overview is in a tabular format, with information divided according to three tasks: (1) to reveal the economic efficiency of the MBA program; the program specializes in the training of entrepreneurs; it can contribute to the internal migration of talents since entrepreneurs are usually qualified workers with significant experience in various fields; (2) to study the scale effect of training managers for the business activities of innovative Alberta with a request for employment from companies and employers; (3) to consider the dynamics of industry practice in the field of corporate entrepreneurship.

*Stage 3:* The assessment of the influence of the triad interaction between education, science, and business as a multiplier on the socio-economic development in the region. This stage rests on the justified and declared influence of the triad values measured at Stage 2 and the research results of the Center for Economic Data and Ideas in Alberta (Office of Statistics and Information Alberta, 2023). In this study, the multiplier refers to the quantified influence of the triad. In turn, an indicator is a point measurement that visualizes the measured social and economic category. To convert the indicators of the measured triad values (Stage 2) into a multiplier, the INDEX function of the Excel program was initially applied to the indicators of the triad (education, science, and business) in the context of resort towns:  $fx = \text{SUM}[\text{INDEX}$



(array; row number; argument)]. This function summarizes all the indicators of the row. Based on these stages, the graph below summarizes the work flow of the analytical approach used in this study (Figure 1).

The data are subject to normalization and generalization to ensure objectivity and comparability in the analysis. Normalization helps standardize data, usually by converting it to a common scale, to avoid distortion due to differences in the range of values. Generalization, in turn, makes the data more concise and understandable. The use of common values of individual variables is due to the need to simplify the analysis and consider the overall dynamics of the influence exerted by the triad on innovative development. The mutual influence of variables when aggregating values was studied through comprehensive analysis and the use of tools such as INDEX in Excel. The considerations of mutual influence give a detailed insight into the interaction within the triad. As a result, the analysis provides a holistic view of its impact on the socio-economic development of the region.

The region's socio-economic development indicators in the assessment are characterized by available statistics (Alberta Government, 2017; Office of Statistics and Information Alberta, 2023): GDP per capita reflects the wellbeing of the population within the regional borders of Alberta; the indicator of the working-age population (15-64 years) reflects the productive power of society.

*The research subject* is the multiplicative influence of the triad interaction between education, science, and business of small urban resort areas on the region's socio-economic development. *The research object* is the process of the triad influence regarding urban innovations of resort towns on the spatial economy. The limitation of the study is the analysis within the framework of resort towns in Canada. The example of Alberta reduces the reliability of the obtained results. This limitation requires broadening the sample to other cities and regions of the country for comparison.

## 3 Results

A review of the literature data has shown that resort towns are not isolated territories. They belong to sovereign administrative units (provinces of the national system). In this vein, a province

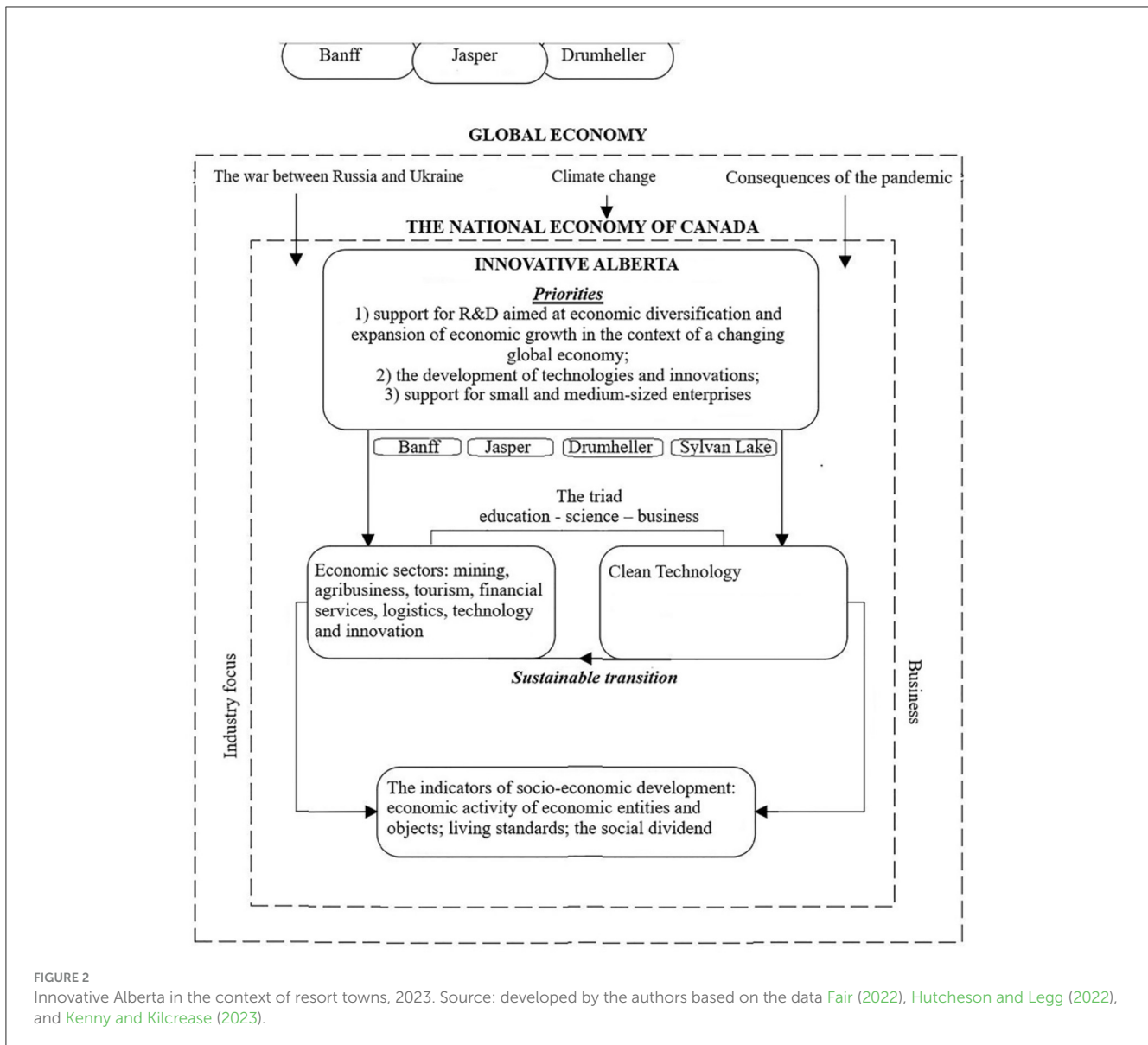


FIGURE 2 Innovative Alberta in the context of resort towns, 2023. Source: developed by the authors based on the data Fair (2022), Hutcheson and Legg (2022), and Kenny and Kilcrease (2023).

occupies a central place in the activities of the national system. As an umbrella structure, a province acts as a socio-economic space that unites territories within regional borders and promotes their integration. In addition, provinces facilitate measures according to government priorities; bring together the subjects and objects of the economy that expand activities through their knowledge, talents, and experience; and connect with global trends. Consequently, the cities and towns of a province are the drivers of the economy and business activity. They provide arrivals from other places or the urban population with national economic opportunities, with an emphasis on the local scale. Thus, the development of resort towns will depend on various practices of human activity and the economic development of the local, regional, and national systems in the context of global norms. Figure 2 presents the innovative development of resort towns: the triad of education, science, and business through the conceptual model of Alberta's socio-economic space. In this context, Alberta includes a set of objects: the natural environment; industrial infrastructure (the main sectors

of energy, agribusiness, and tourism, as well as auxiliary sectors of financial services, logistics, technology, and innovation); business landscape, which designs innovative and productive capabilities of the population; global connectivity. In this regard, resort towns are a place for life, recreation, and business activity of subjects and objects of the economy.

Figure 2 shows that from a global point of view, the daily development of Alberta's socio-economic space, including resort towns, depends on trends and international events. Thus, the war in Ukraine caused new international upheavals; environmental degradation gradually led to climate change; the pandemic COVID accelerated innovation through digitalization. In the regional context, the innovative development of resort towns focuses on three priorities of innovative Alberta: support for science to achieve economic diversification against the backdrop of global changes; technology and innovation development; and support for entrepreneurship. Consequently, the innovative development of small urban resort areas occurs when the urban population

implements the practices of interaction between education, science, and business in the context of managing local opportunities. The education level among the population is sufficient to solve urgent issues related to the resort area's internal environment, achievements, and innovations. At the same time, science drives the internal innovation environment. In turn, business capitalizes and scales education and science from the theoretical classroom and laboratory to meet the needs of employment and the demand for leisure. In addition, the business contributes to socio-economic transformation based on innovative solutions of highly educated talents. The latter can stimulate the development management and economic growth of the city. To substantiate the triad approach in the innovative development of resort towns, the study performed a statistical analysis on the following group of indicators: (1) education (the coverage of the urban population with higher education); (2) science (the coverage of the urban population with a doctoral degree); (3) business (entrepreneurship as an independent initiative or corporate activity, including with an industry focus in for increasing educational, scientific, and business capacities) (Figure 3).

The analysis of the data presented in Figure 3 suggests that the driving forces of the innovative development of resort towns are highly educated talents, mostly from Banff, with a bachelor's degree or higher (from 16.1% to 33.1%) and private entrepreneurship, namely, leaders-innovators (from 11.1% to 14.0%). They find business solutions to problems in the context of global economic changes, help diversify the economy of Alberta, and can create jobs by reducing the seasonality factor of the territory. Science and corporate business with the industry focus of the triad have low development indicators (6.8% and 0.3% to 3.3%, respectively). This feature creates a gap between the creation of knowledge and its use for the public good and converging trends in corporate business management. On average, the shortage of highly educated managerial talents in the country has increased by 148% over the past 5 years (from 145 in 2017 to 360 in 2021). The labor market in Alberta requires MBA or entrepreneurs with an MBA degree. Table 1 presents a general picture of the situation.

Table 1 (G) presents the algorithm for calculating the fxINDEX: an array is the entire range of triad values and the line number of the resort name; zero was set as an argument. Thus, the INDEX function showed a link to the entire line of indicators for each urban resort area. The measurements obtained at three points of the triad [INDEX (I)] made it possible to correlate the education, science, and business values with the needs of the urban population, the realities of socio-economic space, and the quality of innovation management. As an economic category, the measurement indicators at the three points of the triad at the output are integrated into the triad multiplier (TM). It is the geometric mean of the three measurements of the indices (Table 2, G).

$$MT = (IBanff * IJasper * IDrumheller * ISylvanLake) / 4,$$

where  $I$  is the calculation of the fxINDEX in the context of small urban-resort areas.

Given the high indicators of the triad (the urban population with higher education and private entrepreneurship, Figure 3), it is reasonable to increase the local personnel reserve of small

urban resort areas, according to the priorities of innovative Alberta (Figure 2). In this case, MBA graduates focused on corporate business management and are practically well-prepared managers of companies and enterprises (Table 1). The study used a multiplier to assess the impact of the triad interaction between education, science, and business in small urban resort areas on changes in the regional system. The multiplier indicator is a quantitatively measured influence of the triad in the context of resort towns (Banff, Jasper, Drumheller, Sylvan Lake). It represents the geometric mean of three triad measurements for a group of such indicators as education, science, and business. The Methods and Material section describes the algorithm for calculating the triad multiplier (Stage 4). In this measurement, indicators of socio-economic development are the statistical values of GDP per capita. These values reflect the wellbeing level in the region. The proportion of the working-age population (15-64 years) displays the social dividend in the context of the productive forces of society. Figure 4 shows the multiplicative influence of the resort towns' triad on the socio-economic development in the region, using the example of Alberta.

Table 3 of input data to assess the impact of the triad multiplier of resort towns on the socio-economic development in the region in 2016 and 2021.

The presented result of correlation analysis means that a positive correlation occurs when one value (GDP per capita) increases/decreases, while another value (the triad multiplier) simultaneously increases/decreases. A negative correlation reflects the opposite situation when an increase in one value (the working-age population (15-64 years) provokes a fall in another and vice versa. The selected period in the measurement is associated with the population census features regarding the territorial profile of Alberta.

The measurement presented in Figure 4 reveals a positive correlation between the triad multiplier of resort towns and the GDP per capita (fxCORREL = 1). It also reveals a negative correlation between the triad multiplier of resort towns and the indicator of the working-age (15-64) population (fxCORREL = -1). As evidence of a positive correlation, the potential for innovative development of resort towns and the wellbeing level in the region closely correlate in terms of innovative activity in the region's socio-economic space. As evidence of a negative correlation, the growth of the working-age population (15-64) on a regional scale contributes to a decrease in labor resource quality in terms of education, scientific development, and the introduction of innovative practices on a local scale and vice versa. Thus, given the above, the concentration of highly educated talents in the territories of small urban resorts is prone to management and individual activity in innovative entrepreneurship. The mentioned factor positively impacts the wellbeing of the region, including the specifics of improvements in labor resource quality.

Thus, this study suggests focusing efforts on improving the quality of education, supporting research activities, and promoting innovation in business. These measures can solve the identified problem of underdevelopment of medium-sized enterprises and ensure economic sustainability in resort towns. The study emphasizes the relationship between the triad multiplier and economic productivity, highlighting the need for targeted measures to improve education, science, and business practices.

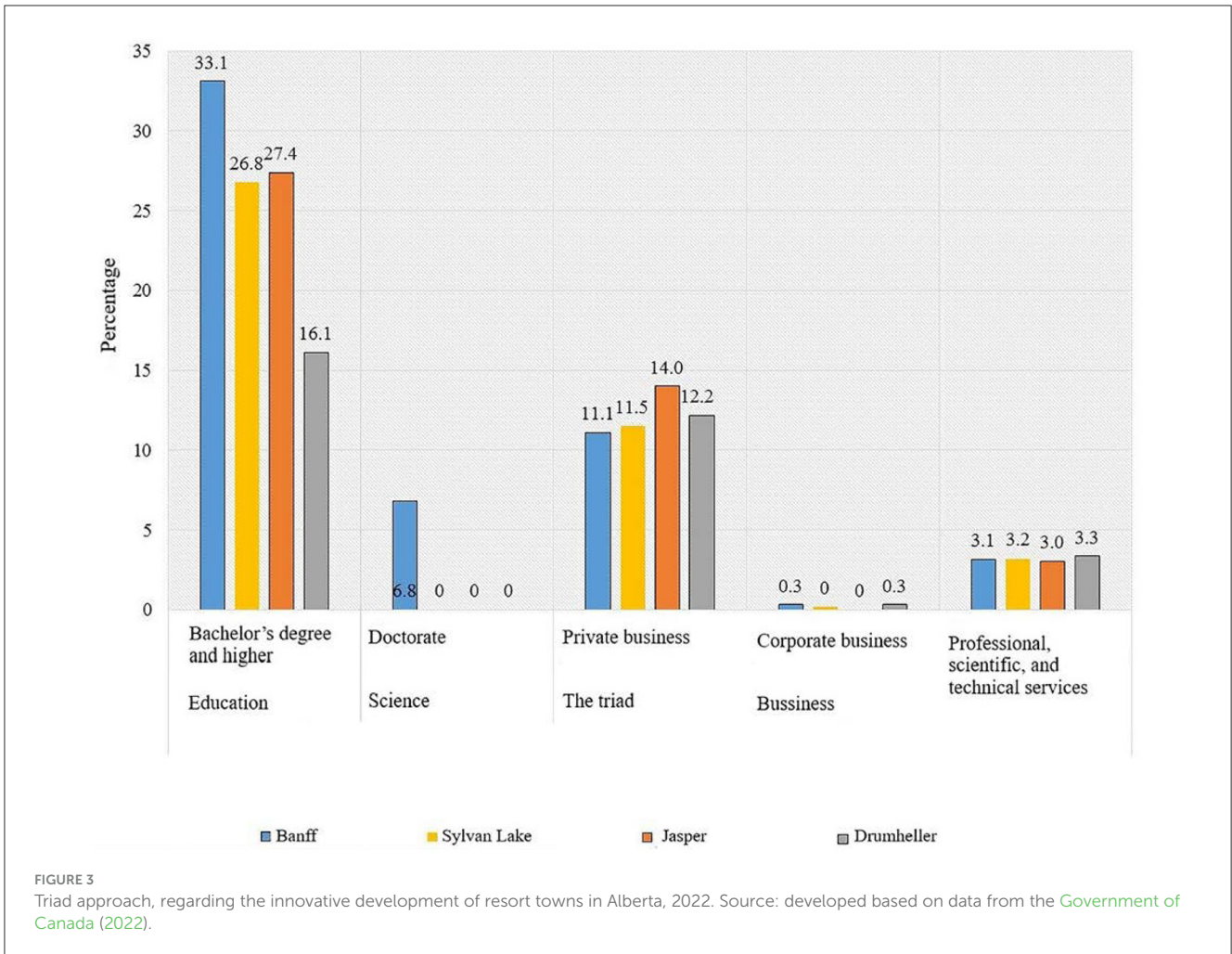


TABLE 1 An overview of Alberta labor market in corporate business management, 2017-2021.

Year	MBA (graduates)	Higher MBA (graduates)	Manager positions	Requirements of a degree higher than a bachelor
2017	477	85	2.100	145
2018	451	98	2.925	125
2019	441	159	2.160	115
2020	514	99	1.840	160
2021	532	111	3.525	360
Changes, %	12%	31%	68%	148%

Source: compiled based on data from Statistics Canada (2023).

At the practical level, the study provides valuable conclusions for managers and policymakers. The findings help navigate the digital business environment of the future, compare the best practices of different territories, and use the innovations of the economy and knowledge society. The proposed measures, such as focusing on innovative trends in university education and science, are considered key to achieving round-the-clock economic dynamics in resort towns.

## 4 Discussion

This study considered the innovative development of resort towns through the prism of a triadic approach. This approach aimed to assess the local impact of changes in the regional system. Initially, the study built a conceptual model of the socio-economic space of innovative Alberta regarding resort towns and the triad of education, science, and business. The applied methodology structured the relationships between all stakeholders in the context



TABLE 2 The input data for measuring the triad multiplier regarding resort towns in Alberta, 2016 and 2021.

A	B	C	D	E	F	G	H
Resort towns	Triad 2016					The measurement at the three points of the triad $f \times \text{INDEX (I)}$	The triad multiplier (TM) = $(I_{\text{Banff}} * I_{\text{Jasper}} * I_{\text{Drumheller}} * I_{\text{Sylvan Lake}}) / 4$
	Education	Science	Business				
	Bachelor's degree and above	Doctorate	Private business	Corporate business	Professional, scientific, and technical services		
Banff	27.9	18.5	9.7	0	3.4	= SUM[INDEX(B3:F4;3;0)] = 59.5	45.7
Jasper	21.5	0	12.4	0	3.8	= SUM[INDEX (B3:F4;4;0)] = 37.7	
Drumheller	10.9	15.0	13.1	0.2	4.2	= SUM[INDEX (B3:F4;3;0)] = 43.4	
Sylvan Lake	17.2	10.0	11.5	0	3.6	= SUM[INDEX (B3:F4;3;0)] = 42.3	
Resort towns	Triad 2021					The measurement at the three points of the triad $f \times \text{INDEX (I)}$	The triad multiplier (TM) = $(I_{\text{Banff}} * I_{\text{Jasper}} * I_{\text{Drumheller}} * I_{\text{Sylvan Lake}}) / 4$
	Education	Science	TM = $(I_{\text{Banff}} * I_{\text{Jasper}} * I_{\text{Drumheller}} * I_{\text{Sylvan Lake}}) / 4$				
	Bachelor's degree and above	Doctorate	Private business	Corporate business	Professional scientific and technical services		
Banff	27.9	18.5	9.7	0	3.4	= SUM[INDEX (B8:F10;8;0)] = 54.5	43.1
Jasper	21.5	0	12.4	0	3.8	= SUM[INDEX (B8:F10;9;0)] = 44.4	
Drumheller	10.9	15.0	13.1	0.2	4.2	= SUM[INDEX (B8:F10;10;0)] = 31.9	
Sylvan Lake	17.2	10.0	11.5	0	3.6	= SUM[INDEX (B3:F4;3;0)] = 41.5	

Source: compiled based on data from the [Government of Canada \(2022\)](#) and [Office of Statistics and Information Alberta \(2023\)](#).

of the priority policy in the region as an administrative unit of the national system against the background of global economic changes. It also highlighted the main characteristics of the triad. The conceptual model was implemented using the method of collection, analysis, and generalization. The method most clearly displays the region's development and functioning in real-time. [Ammara et al. \(2022\)](#) studied the urban dynamics of smart cities, investigating the organization of the system through various interactions between stakeholders, components, and subsystems. The researchers emphasized the introduction and use of new knowledge to improve the capabilities of the city. They also noted the importance of the innovation policy aimed at the innovative development of cities on a sustainable basis. This policy can improve all indicators of the system development. Within the framework of the theoretical approach, [Sumina \(2018\)](#), assessed the potential opportunities for innovative development on a regional scale. The author identified a new category - the innovative advantages of the region as an efficiency indicator of innovations. Therefore, innovative development depends on the dynamic indicators of innovative changes. [Nunes et al. \(2021\)](#) underline the complexity of the analysis that determines the factors of innovative changes in cities and uses digital measurements of innovation

effectiveness. This procedure encompasses countless multiple and constantly changing variables. In this regard, the researchers proposed to apply a systematic approach. This approach can reveal factors that foster urban innovation development. By understanding the relationship between these determinants, it is possible to analyze the dynamics of their influence. The effective relationships between infrastructure, the local community, and visitors require the involvement of citizens. Citizens are the main resource for innovative infrastructure development in the city ([Ligarski and Wolny, 2021](#)). This conclusion is consistent with the results obtained earlier by [Hollands \(2020\)](#). This study measured the innovative development of small urban resort areas based on objective statistical data on the unity of education, science, and business. It analyzed coverage of the urban population with higher education, private and corporate entrepreneurship, and employment in the sectoral economy. As noted by [Levandá \(2023\)](#), in the context of global changes, the widespread pandemic, and geopolitical instability, the most qualitative and accessible measurement tool is a statistical analysis based on objective indicators from open resources of national systems. This statement is in line with the idea of this study. Our analysis showed that some indicators emphasize the importance of the measured

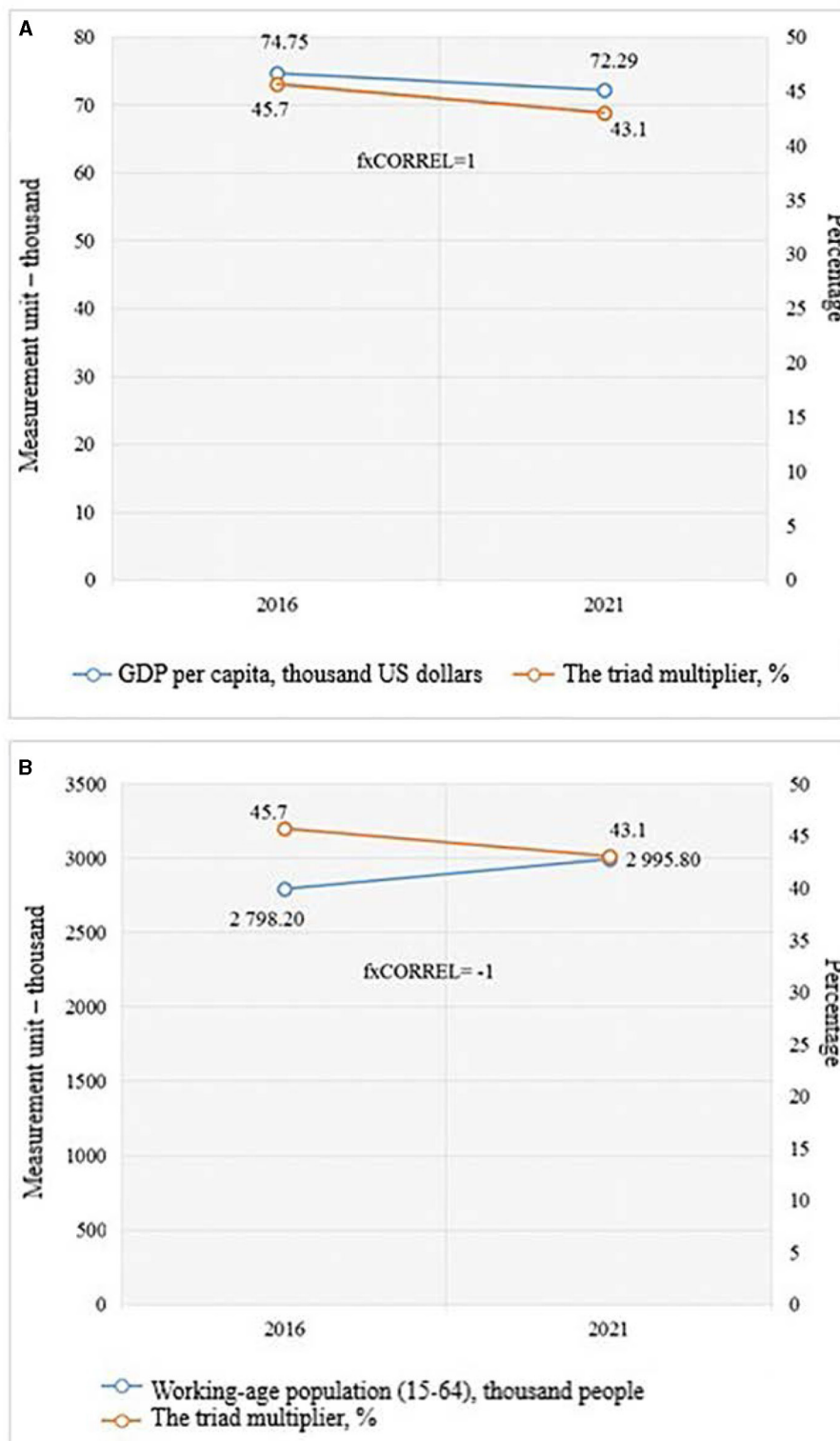


FIGURE 4 (A, B) The multiplicative influence of the triad of resort towns on the socio-economic development in the region, and also GPT per capita and working-age population (15–61), the example of Alberta. Source: developed based on data from the Alberta Government (2017), Government of Canada (2022), and Office of Statistics and Information Alberta (2023).

values of education and small business triad in the development of urban innovation. This finding is important for subsequent analysis and evaluation. From a constructivist point of view, Braga

et al. (2021), concluded that the created analysis system based on a group of indicators is a learning mechanism. Although it provides an understanding of the practical problem under study,

TABLE 3 The input data of correlation analysis.

	A	B	C	D
1	Measurement indicators	2016	2021	Correlation result
2	GDP per capita, thousand US dollars	74.75	72.29	$\text{fxCORREL}(B2:C2;B3:C3) = 1$
3	The triad multiplier, %	45.7	43.1	
4	The working-age population (15-64), thousand people	2 798.2	2 995.8	$\text{fxCORREL}(B4:C4;B5:C5) = -1$
5	The triad multiplier, %	45.7	43.1	

Source: developed by the authors based on data from Alberta Government (2017), Government of Canada (2022), and Office of Statistics and Information Alberta (2023).

it is insufficient as a tool for predicting optimal solutions. To identify the influence of the triad in resort towns within the region, the study used a correlation analysis. The analysis compared the following pairs of values: the triad multiplier and GDP per capita (describes the wellbeing of the region); the triad multiplier and the proportion of the working-age (15-64 years) population (the labor resources of the society). Ligarski and Owczarek (2023) indicated that the study of urban areas should focus on the wellbeing of the population. In practice, this approach can lead to a more effective management system, which will contribute to economic growth and higher living standards. The correlation result obtained in this study, on the one hand, indicates a strong positive relationship. This relationship means that the multiplicative influence of the triad of small urban resort areas and the GDP per capita of the region equally affect the national system. On the other hand, there is a negative connection, which implies that the multiplicative influence of the triad of small urban resort areas and the labor resources of the region have a different power of influence in the socio-economic space. Thus, the general trend of the innovative potential of resort areas (regarding education, science, and business) primarily refers to the highly educated talents of the urban population and private entrepreneurship. This conclusion is partially consistent with that of Chang and Smith (2023). The researcher indicated that a reasonable, informed, educated society mainly depends on the participation of people, followed by environmental conservation and sustainable energy management within the economic system. Resort areas are characterized by an increase in population density and infrastructure congestion in summer and a decrease in the load on the territory in winter. Therefore, it is necessary to diversify the local economy to minimize and avoid risks from the seasonality factor (Gomilevskaya and Solomonyuk, 2021). These issues can be offset by encouraging higher education to meet the needs of the territory (Ressin, 2023). As defined in this study, the level of education in small urban resort areas relies on universities, MBA programs, and science aimed at training and graduating entrepreneurs focused on the spatial economy. Given the above, the conceptual model developed in the study reflects urban innovations through the triad of education, science, and business. The model focuses on national systems and innovations, considering the capabilities of the local area. In practice, this model will allow the regional government to facilitate a qualitative analysis of the main social and economic indicators of the system. Consequently, it will be possible to increase economic sustainability against the background of global changes.

## 5 Conclusions

The conclusions of the study underscore that the innovative progress of the resort towns in Alberta, including Banff, Jasper, Drumheller, and Sylvan Lake, largely depends on the high level of education among the local population and the developed entrepreneurial environment. The notable increase in the number of graduates from MBA programs and leadership positions indicates an increasing demand for skilled professionals in the field of corporate governance. Although the level of scientific development and corporate business remains relatively low, the utilization of the triad of education, science, and business proves to be an effective method for stimulating innovative progress. The positive correlation between the triad of factors and GDP per capita suggests prospects for economic development in the region with proper resource utilization. On the other hand, the negative correlation with the number of working-age population aged 15 to 64 indicates the need to improve the quality of the workforce and attract qualified workers to the innovative environment. Furthermore, the conceptual analysis of the research model confirms that the innovative development of resort towns occurs within the framework of interaction between the regional economy, the national system, and global trends.

In practice, these findings will help managers and politicians to navigate the digital business landscape in the future, compare best practices by different territories, and use the innovations of the economy and the knowledge society. In this case, it will be possible to improve living standards within regional borders, and, as a result, in the national system. Further research will identify the economic benefits of the investment to the innovative development of cities, considering corporate and political interests.

Thus, this research makes a significant contribution to the exploration of territorial aspects of innovative development, focusing on the context of resort cities, particularly within the province of Alberta in Canada. The primary contribution lies in the analysis of the economic landscape and the identification of issues related to the absence of development in medium-sized enterprises in the region, which could generate employment and meet local needs. This aids in understanding the challenges faced by resort cities in ensuring economic sustainability. Potential enhancements may involve a more detailed analysis of various sectors of the province's economy and their impact on local development.

Additionally, it is crucial to study potential strategies for stimulating innovation in currently less-developed areas. Future developments could include expanding the research to other resort cities and provinces, as well as exploring other aspects of innovation, such as technological progress and community engagement.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Author contributions

MR: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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