Research paper / Оригинальная статья
https://doi.org/10.51176/1997-9967-2026-3-104-120
МРНТИ: 06.61.33
JEL: O14, R11, R12

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Creative New Industrialization and Economic Development of Single-Industry Towns in the Russian Far East

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For citation: Antonova, I. S. (2026). Creative New Industrialization and Economic Development of Single-Industry Towns in the Russian Far East. Economy: strategy and practice, 21(3), 104-120. https://doi.org/10.51176/1997-9967-2026-3-104-120

ABSTRACT

The development of creative industries is considered one of the areas of structural transformation of resource-dependent and single-industry cities, whose economic development is limited by the existing sectoral specialization and spatial remoteness. The aim of the study is to identify the spatial patterns of new creative industrialization and to examine the economic factors influencing the development of creative industries in resource-oriented and single-industry cities, as well as in certain regional centers of the Russian Far East. Methods of spatial panel econometrics, global and local Moran indices, Lagrange multiplier tests, and SAR, SEM, SDM, and GSPRE models were applied. The initial data were compiled based on the financial statements of enterprises from the SPARK information and analytical system for 2013–2022. The sample includes 26 settlements (17 single-industry towns and 9 administrative centers), or 260 annual observations. The SDM_fe1 model (AIC = 913.0; BIC = 934.4) revealed positive direct effects of ICT dynamics (0.020) and the concentration of core assets in creative industries (1.131). The concentration of wages is characterized by a statistically insignificant direct effect (0.215) and a significant negative spatial effect (−2.933). The results indicate that the business climate in single-industry towns, which allows enterprises to potentially understate wages by leveraging their status as small and micro-enterprises, becomes a negative factor in spatial development, manifesting itself in a decline in the growth rates of creative industries in nearby single-industry towns.

KEYWORDS: Economy, Economic Development, Economic Diversification, Regional Economy, Spatial Development, Single-Industry Town, Russia

CONFLICT OF INTEREST: the author declares that there is no conflict of interest

FINANCIAL SUPPORT: this study was supported by **the Russian Science Foundation (grant No. 25-28-01135**, https://rscf.ru/project/25-28-01135)

Article history:
Received 16 April 2026
Accepted 25 August 2026
Published 30 September 2026

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Креативная новая индустриализация и экономическое развитие моногородов Дальнего Востока России

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Для цитирования: Антонова И.С. (2026). Креативная новая индустриализация и экономическое развитие моногородов Дальнего Востока России. Экономика: стратегия и практика, 21(3), 104-120. https://doi.org/10.51176/1997-9967-2026-3-104-120

АННОТАЦИЯ

Развитие креативных индустрий рассматривается как одно из направлений структурной трансформации ресурсозависимых и монопрофильных городов, экономическое развитие которых ограничено сложившейся отраслевой специализацией и пространственной удалённостью. Цель исследования – выявить пространственные закономерности новой креативной индустриализации и изучить экономические факторы, влияющие на развитие креативных индустрий в ресурсоориентированных и моногородах, а также в отдельных региональных центрах Дальнего Востока России. Применены методы пространственной панельной эконометрики, глобальный и локальный индексы Морана, тесты множителей Лагранжа, модели SAR, SEM, SDM и GSPRE. Исходные данные сформированы на основе финансовой отчётности предприятий информационно-аналитической системы СПАРК за 2013–2022 гг. Выборка включает 26 населённых пунктов (17 моногородов и 9 административных центров), или 260 годовых наблюдений. Модель SDM_fe1 (AIC = 913,0; BIC = 934,4) выявила положительные прямые эффекты динамики ИКТ (0.020) и концентрации основных средств креативных индустрий (1.131). Концентрация заработной платы характеризуется статистически незначимым прямым эффектом (0.215) и значимым отрицательным пространственным эффектом (−2.933). Результаты свидетельствуют о том, что деловой климат в моногородах, позволяющий предприятиям потенциально занижать заработную плату, используя свой статус малых и микропредприятий, становится негативным фактором пространственного развития, проявляясь в снижении темпов роста креативных индустрий в близлежащих моногородах.

КЛЮЧЕВЫЕ СЛОВА: экономика, экономическое развитие, экономическая диверсификация, региональная экономика, пространственное развитие, моногород, Россия

КОНФЛИКТ ИНТЕРЕСОВ: автор заявляет об отсутствии конфликта интересов

ФИНАНСИРОВАНИЕ: исследование выполнено за счет гранта Российского научного фонда № 25–28-01135 (https://rscf.ru/project/25-28-01135)

История статьи:
Получено 16 апреля 2026
Принято 25 августа 2026
Опубликовано 30 сентября 2026

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INTRODUCTION

Resource-based and single-industry towns have attracted growing scholarly attention because structural constraints affect their economic development and diversification (He et al., 2017; Hu, 2024; Pani, 2009). From the perspective of urban development cycles and techno-economic paradigms, creating and renewing development paths in remote industrial cities remain important research challenges (Czamanski & Broitman, 2018; Perez, 2002; Wan et al., 2015). Periods of economic stagnation may encourage searches for alternative development trajectories shaped by emerging economic and technological trends (Li, 2020; Priemus, 2004). Among these trends, creative industries have received increasing attention as a potential source of regional economic transformation (Capello, 2008; Evans, 2009; Kourtit & Nijkamp, 2019; Turgel et al., 2023).

The UK Department for Culture, Media and Sport (DCMS) played an important role in establishing creative industries as a distinct area of economic activity through its mapping documents published in 1998 and 2001 (DCMS, 1998, 2001). Creative industries represent a significant component of the global economy, contributing approximately 3.1% of global GDP. However, their economic contribution varies considerably across countries, ranging from 0.5% to 7.3% of GDP among the economies covered by the UNCTAD survey. Software services and research and development (R&D) have become particularly important components of creative services exports, accounting for 41.3% and 30.7%, respectively, in 2022. Digitalization is also transforming the production, distribution and consumption of creative goods and services (Li, 2020; UNCTAD, 2024).

The development of creative industries is closely associated with the formation of creative clusters, which facilitate knowledge exchange, cooperation and economic interaction among enterprises (Boal-San Miguel & Herrero-Prieto, 2020; He & Gebhardt, 2014; Porter, 1998). At the same time, digital technologies are increasingly influencing the development patterns of these clusters (Li, 2020). Several national and international classifications of creative industries include software and related digital activities, although their scopes differ. In this study, information and communication technologies (ICT) are examined separately from other creative industries to assess their potential role as the technological core of creative new industrialization. Particular attention is given to geographically isolated resource-based settlements, where established industrial structures and limited transport accessibility may constrain the emergence of new economic activities.

This study aims to identify spatial patterns of creative new industrialization and examine the economic factors influencing the development of creative industries in resource-based and single-industry towns and selected regional centers of the Russian Far East. The research hypothesis suggests that the growth of information and communication activities is positively associated with the development of non-ICT creative industries, even under conditions of path dependence and spatial interdependence shaped by road accessibility.

To test this hypothesis, the study applies spatial econometric models to panel data covering 26 settlements from 2013–2022. The analysis examines the relationship between ICT growth and the dynamics of non-ICT creative industries, accounting for fixed-asset concentration, wage concentration, and spatial interactions between settlements.

The remainder of the article is structured as follows. The literature review examines the theoretical foundations of creative new industrialization and path renewal. The methodology section describes the data sources, variables, and spatial econometric approach. The results section presents the estimated relationships and spatial effects, followed by a discussion of their implications for regional economic development. The conclusion summarizes the study's main findings and limitations.

LITERATURE REVIEW

According to Porter (1998), clusters represent geographic concentrations of interconnected firms and institutions that benefit from proximity, knowledge exchange, and competitive advantages. The cluster approach emphasizes the importance of geographical concentration in shaping regional economic development. Nevertheless, Porter's cluster theory has been widely criticized for its conceptual ambiguity, methodological limitations,

and challenges in practical implementation (Swords, 2013). The new industrial approach, based on the techno-economic paradigm and developed in Perez's work, assumes the dominant role of the technological factor in economic development. The modern stage belongs to the era of information and communication technologies, whose introduction is becoming a key driver of economic development (Madalin & Andreica, 2023; Perez, 2002). However, this approach does not explicitly account for local conditions and, therefore, does not fully explain the development challenges faced by remote resource-based cities characterized by established industrial structures (Glazyev, 2009).

These settlements operate within a complex system of technological interactions, in which technologies associated with different techno-economic paradigms exert mutual influence. Such interactions may be facilitative, inhibitory, or neutral, shaping the trajectory of technological development across economic sectors (Pilyasov & Kotov, 2024; Pistorius & Utterback, 1997). Furthermore, resource-based cities and single-industry towns are characterized by strong path dependence, where new technologies may face resistance from established institutional norms and economic structures (Hayter, 2017; Zamyatina & Pilyasov, 2016). In this context, integrating new industrial and cluster-based approaches provides a theoretical basis for examining the development of creative industries. This integration can be conceptualized through creative new industrialization and the formation of creative information and communication clusters.

Creative industries represent economic activities associated with the commercial application of intellectual property derived from individual creativity. These activities encompass art and antiques, music, architecture, media, fashion and design, film, and publishing. Software and game production have also become important components of creative industries. Educational activities and research and development (R&D) are classified separately under certain national frameworks (Antonova, 2025; DCMS, 1998, 2001; He & Gebhardt, 2014; Stam et al., 2008). Software developed within ICT activities serves as a technological foundation for a wide range of economic sectors, extending beyond creative industries (Glazyev, 2009). Although Florida (2017) identified ICT-related employment as an important component of the creative class, digital technologies increasingly influence economic activities across different sectors (Madalin & Andreica, 2023). Consequently, ICT and related activities can be considered fundamental to the technological paradigm of new industrialization, including creative new industrialization.

Creative industries are frequently examined in relation to local identity formation through the integration of historical heritage into urban regeneration initiatives. This approach often involves introducing creative activities into historically significant urban spaces to stimulate their revitalization (Zeng et al., 2020). The creative reindustrialization of abandoned industrial sites has also become a visible manifestation of China's Second Transition, attracting international attention (Zielke & Waibel, 2014). Numerous projects worldwide integrate local historical identity (Genius Loci) with contemporary technological and cultural transformation (Zeitgeist). Examples include the Confluence project in Lyon (France), HafenCity in Hamburg (Germany), Stary Browar in Poznań (Poland), the Cultural Industries Quarter in Sheffield (UK), industrial building conversions in Forssa (Finland), the Vienna Gasometers (Austria), the DUMBO district in New York (USA), the conversion of fuel tanks into art galleries in the Longhua Airport area in Shanghai (China), the transformation of slaughterhouses into a cultural centre in Porto (Portugal), the conversion of a granary into a hotel in Cape Town (South Africa), the reconstruction of a former fire station in the port of Antwerp (Belgium), and the GES-2 House of Culture in Moscow (Russia). These examples illustrate the potential of creative industries, particularly in architecture and urban regeneration, to incorporate cultural heritage into contemporary spatial development.

Although the physical transformation of cities is not always immediately visible, redevelopment, revitalization and reindustrialization may generate significant economic effects. The emergence of a digital creative cluster in East London following the 2008 financial crisis illustrates the role of geographical concentration and interaction between digital technologies, advertising, design, marketing and communications (Foord, 2013). Such interactions between different creative activities

contribute to the emergence of new products and business models, although their development patterns remain heterogeneous. In this context, information and communication activities may provide a technological foundation for creative new industrialization and contribute to the renewal of established urban development paths (Antonova, 2025; Li, 2020; Zamyatina & Pilyasov, 2016).

A scientometric analysis of publications indexed in the Lens database was conducted to examine research patterns associated with techno-economic and cluster paradigms, both as independent theoretical approaches and in relation to creative industries. Figure 1 presents the keyword co-occurrence network for publications examining the techno-economic paradigm.



Figure 1. Keyword co-occurrence network for the techno-economic paradigm

Figure 1 shows that research on the techno-economic paradigm covers several interconnected areas. Technology occupies a central position in the network, linking social values and health equity with COVID-19 and the circular economy. A separate thematic cluster brings together sustainable development, natural resource conservation and policy, while China, Europe and political economy form another group of related keywords. These connections indicate that researchers increasingly examine technological change alongside the environmental, social, and institutional aspects of economic development.

To examine the application of cluster theory within creative industries, we constructed a corresponding keyword co-occurrence network (Figure 2).

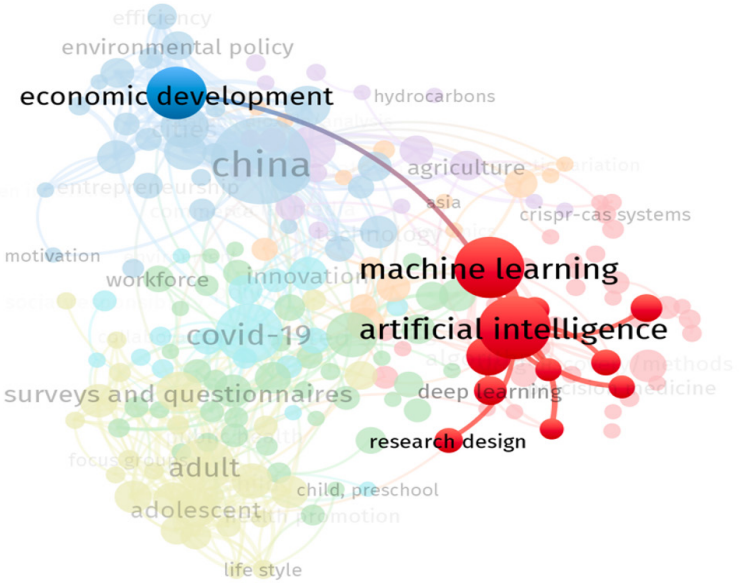


Figure 2. Keyword co-occurrence network for the cluster paradigm in creative industries

Figure 2 highlights the growing role of artificial intelligence and machine learning, which form a distinct and closely connected cluster. Another prominent group brings together China, economic development, innovation and COVID-19, reflecting the relationship between technological change and broader economic processes. A separate cluster includes surveys and questionnaires, adult, adolescent and lifestyle-related research. The links between these groups indicate that studies within the cluster paradigm increasingly combine digital technologies, economic development and social dimensions.

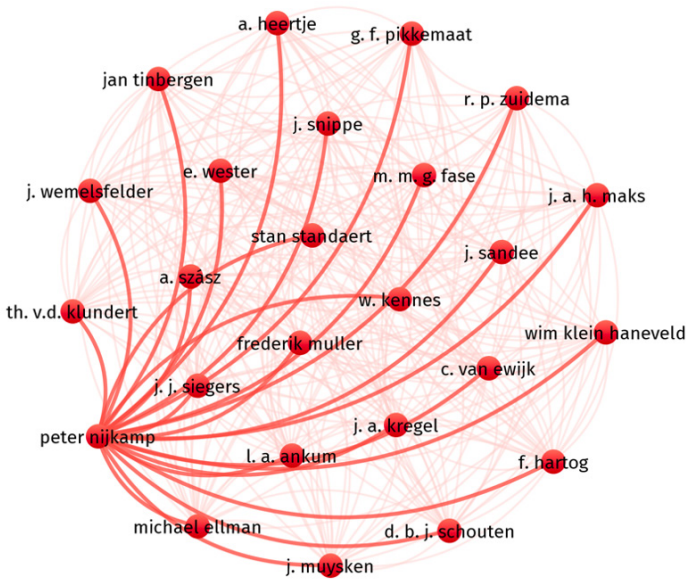


Figure 3. Co-authorship network for research on the techno-economic paradigm in creative industries

Figure 3 shows a dense network of scientific collaboration, with Peter Nijkamp occupying a prominent position through numerous connections with other researchers. Particularly strong links are observed between Nijkamp and several authors, including J. J. Siegers, F. Müller and J. A. Kregel. The network also includes Jan Tinbergen, A. Heertje, G. F. Pikkemaat and other scholars. The concentration of connections around Nijkamp highlights his role in the collaborative research network associated with the techno-economic paradigm.

The co-authorship network illustrates collaboration patterns within this research area. P. Nijkamp's contribution is particularly relevant to the conceptual development of creative knowledge cities (Van Geenhuizen & Nijkamp, 2012). The edited volume *Creative Knowledge Cities: Myths, Visions and Realities* examines the relationship between knowledge, creativity and urban development. Nevertheless, existing research places considerable emphasis on knowledge-based urban transformation, while the potential of creative industries to facilitate structural economic change in remote industrial settlements remains insufficiently explored.

Remote resource-based cities and single-industry towns face considerable challenges in creating new development paths. In such settlements, developing creative industries may offer opportunities to overcome established economic structures and support path renewal. ICT can play an important role in this transition by providing a technological basis for creative new industrialization (Antonova, 2025). However, strong path dependence, associated with established institutional norms and economic structures, may constrain the adoption of new technologies. This is particularly relevant to single-industry towns, where economic development has historically been shaped by the interests and activities of a dominant, often resource-based enterprise (Martin, 2017).

New path creation involves both the emergence of new economic activities and the restructuring of existing town-forming industries. Small and

medium-sized enterprises can contribute to this process, particularly when supported by appropriate business infrastructure (Muraya, 2006). Special economic zones (SEZs) represent one possible instrument for stimulating industrial diversification and attracting new enterprises, although their effectiveness in promoting industrial growth and technological development varies across regions (Ye et al., 2024).

Combining the theory of technological paradigm shifts with Porter's cluster approach provides a framework for examining the development of creative industries in geographically isolated settlements of the Russian Far East (Glazyev, 2009; Perez, 2002). While Perez emphasizes the role of ICT in the current techno-economic paradigm, Porter's approach highlights the importance of geographical concentration, inter-firm relationships, and local economic conditions.

Within this framework, path dependence is operationalized through wage concentration, which reflects the distribution of reported wage payments among enterprises within a town. A high concentration may indicate the continued dominance of a limited number of employers, particularly town-forming enterprises, whereas lower concentration may reflect a more diversified local business structure. Although this indicator does not directly measure institutional quality or informal economic activity, it provides an opportunity to examine the relationship between established economic structures and the development of creative industries.

Thus, combining cluster theory with the techno-economic approach provides a theoretical basis for examining creative new industrialization in remote resource-based and single-industry towns. Particular attention is given to the role of ICT, established industrial structures and geographical accessibility in shaping the development of creative industries and the potential for path renewal.

RESEARCH METHODS

The study examines the relationship between information and communication technologies (ICT) and the development of creative industries in resource-based and single-industry towns of the Russian Far East. The empirical approach draws on the cyclical interpretation of regional economic development and considers the potential bidirectional relationship between creative industries and local economic conditions (Capello & Nijkamp, 2009; Aoyama et al., 2015: Czamanski & Broitman, 2018). The analysis examines the relationship between creative industry dynamics and selected explanatory factors and introduces predetermined lags for concentration measures to reduce potential contemporaneous feedback (Czamanski & Broitman, 2018; Kitchin, 1923; Kuznets, 1940; Markusen, 1985). Given the relatively early stage of creative new industrialization in Russia, the study specifies the dynamics of non-ICT creative industries as the dependent variable (Antonova, 2025; Gushchina & Tarabanova, 2022). The study examines ICT development, enterprise concentration, and spatial accessibility as explanatory factors. Temporal relationships between the main variables are additionally assessed using panel fixed-effects Granger-style tests.

The dependent variable (CIGR) measures change in the aggregated revenue of creative industries, excluding ICT activities. The corresponding ICT indicator (ITGR) is calculated separately to examine the relationship between digital activities and the development of other creative sectors. Both indicators are expressed as annual revenue growth factors (1):

$$CI_{GR} = \frac{CI_t}{CI_{t-1}} \quad (1)$$

where:

CI_{GR} – the annual revenue growth factor of creative industries excluding ICT in settlement i in year t;

CI_t – the aggregate revenue of non-ICT creative industries and ICT enterprises;

i, t – settlement identifier.

The independent variable reflecting the co-development of creative industries with ICT will be the dynamics of aggregated ICT revenue, calculated using the formula (2):

$$IT_{GR} = \frac{IT_t}{IT_{t-1}} \quad (2)$$

where:

IT_t – the annual aggregated revenue of ICT enterprises, adjusted for the rate of inflation, t – year.

A factor greater than 1 indicates revenue growth, while a factor between 0 and 1 indicates a decline. A zero denominator makes the respective ratio undefined; the treatment of such cases must be specified consistently with the estimation dataset. Structural path dependence is proxied by the Herfindahl–Hirschman Index of reported wage concentration across all enterprises within a settlement, calculated using the formula (3):

$$\mathrm{HHIW}_{it} = \sum_{k=1}^{m_{it}} \left(\frac{W_{kit}}{W_{\mathrm{total},it}} \right)^2 \quad (3)$$

where:

HHIW_{it} – Herfindahl–Hirschman Index of wage concentration in settlement *i* in year *t*;

W_{kit} – the annual reported wage bill of enterprise *k* in settlement *i* in year *t*;

$W_{\mathrm{total},it}$ – the sum of the reported wage bills of all enterprises included for settlement *i* in year *t*;

m_{it} – the number of enterprises included in the wage-concentration calculation.

A higher HHIW value indicates a greater concentration of reported wage payments among a limited number of enterprises, reflecting the potential dominance of town-forming employers. In this study, wage concentration is used as an indicator of structural path dependence rather than a direct measure of institutional quality or informal economic activity. The dominance of a single town-forming enterprise (HHI_W=1) results in the formal reporting of wage income primarily by that enterprise. Consequently, other enterprises, including those in the creative industries, may exhibit lower levels of formal economic activity, potentially reflecting engagement in the informal sector or alternative reporting practices.

The concentration of fixed assets in creative industries (HHI_{CIFA}) as independent variable is calculated as follows (4):

$$\mathrm{HHICIFA}_{it} = \sum_{k=1}^{q_{it}} \left(\frac{\mathrm{FA_{kit}}}{\mathrm{FA_{total,it}}} \right)^2 \quad (4)$$

where:

$\mathrm{HHICIFA}_{it}$ – Herfindahl–Hirschman Index of fixed-asset concentration among creative-industry enterprises in settlement *i* in year *t*;

FA_{kit} – the value of fixed assets held by creative-industry enterprise *k* in settlement *i* in year *t*;

$\mathrm{FA}_{\mathrm{total},it}$ – the sum of fixed assets of all creative-industry enterprises included for settlement *i* in year *t*;

q, it – the number of creative-industry enterprises included in the calculation

Both concentration measures range from 0 to 1 when defined using non-negative enterprise values. Higher values indicate a more concentrated distribution; the precise lower bound depends on the number of enterprises. Previous research suggests that creative industries in Russian single-industry towns may mirror the concentrated structure of local economies (Antonova & Pchelintsev, 2023).

Predetermined concentration variables were constructed from an extended SPARK dataset covering 2010–2022. In the baseline estimation, HHICIFA enters with a one-year lag (t−1), and HHIW enters with a three-year lag (t−3). Alternative wage-concentration lags (t−1, t−2, and t−3), with HHICIFA held at t−1, were compared using the Akaike, Bayesian, and Hannan–Quinn information criteria. The lagged variables are matched to all 260 observations in the final estimation sample. Complementary panel fixed-effects Granger-style tests examine the main variables at lag orders 1–3.

To consider the spatial factor of transport accessibility, the matrix of inverse distances between the cities of the Far Eastern Federal District by road are gathered, sorted and explored W_{ij} (5):

$$W_{ij} = \begin{cases} 0, \ if \ i = j, \\ \frac{1}{d_{ij}}, \ if \ i \neq j, \end{cases} \quad (5)$$

where:

W_{ij} – row-standardized spatial weight linking settlement *i* to settlement *j*;

d_{ij} – road distance between settlements *i* and *j*;

i, j– indices of settlements;

k – index used to sum inverse distances across settlements.

The diagonal elements are set to zero, and the spatial weight matrix is row-standardized so that

the sum of weights in each row equals one. The same matrix is used for spatial autocorrelation diagnostics and spatial regression estimation.

Spatial autocorrelation is assessed using global Moran's I and local Moran's I (LISA). Lagrange-multiplier and robust LM diagnostics are used to examine spatial dependence. Conventional fixed- and random-effects specifications are compared with spatial autoregressive (SAR), spatial error (SEM), Spatial Durbin (SDM) and generalized spatial panel random-effects (GSPRE) specifications where applicable. Model selection considers information criteria and spatial diagnostics; the reported focal specification is SDM_fe1.

The introduction of the distance matrix makes it possible to estimate the spatial autocorrelation indices – the global (I) and local (LISA) Moran indices (Pregi & Novotný, 2025) using the following formulas (6-7):

$$\mathrm{I} = \frac{\mathrm{n}}{K} \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij}(X_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^{n} (x_i - \bar{x})^2} \quad (6)$$

$$\mathrm{Lisa} = \frac{\mathrm{n}(x_i - \bar{x})}{\sum_{i=1}^{n} (x_i - \bar{x})^2} \sum_{j=1}^{n} W_{ij}\left(x_j - \bar{x}\right) \quad (7)$$

where:

x_i, x_j – the attribute features of objects *i* and *j*, respectively;

$\bar{x}$ – the average value of the feature for n objects;

W_{ij} – the spatial weight for a pair of objects *i* and *j*;

n – the total number of objects, K is the sum of the weights.

The Local Moran's I values are considered only for those year windows where the index was statistically significant at the $p < 0.05$ level. Years with non-significant spatial autocorrelation were excluded to avoid cluttering the analysis with noise. The Lagrange test also confirms the evaluation results. Significant LM-lag and Robust LM-lag indicate a spatial lag of the dependent variable, robust to spatial autocorrelation in errors. The presence of spatial autocorrelation will indicate the presence of spatial effects in the variables of the regression model, which in the general case will be presented as follows (8):

$$y_{it} = \alpha + \beta_k x_{k_{it}} + \varepsilon_{it} \quad (8)$$

where:

y_{it} – dependent variable;

$x_{k_{it}}$ – group of independent variables;

ε_{it} – the remnants of the model.

The model allows for testing fixed and random effects of time and place. Next, the following spatial regression models are tested (9–13).

1. The spatial autoregressive model (SAR), estimated to have fixed effects (SAR_fe) and random effects (SAR_re), is expressed as follows (9):

$$y_{it} = \alpha + \beta_k x_{k_{it}} + \rho W y_{it} + \mu_i + \varepsilon_{it}, \quad (9)$$

2. The spatial error model (SEM), estimated to have fixed effects (SEM_fe) and random effects (SEM_re), is specified as follows (10):

$$y_{it} = \alpha + \beta_k x_{k_{it}} + \mu_i + \lambda W u_{it} + \varepsilon_{it}, \quad (10)$$

3. The spatial autoregressive combined model (SAC), incorporating both spatial lag and spatial error dependence, is specified as follows (11):

$$y_{it} = \alpha + \rho W y_{it} + \beta_k x_{k_{it}} + \\ + \mu_i + \lambda W u_{it} + \varepsilon_{it} \quad (11)$$

4. The Spatial Durbin model (SDM), estimated with fixed effects (SDM_fe) and random effects (SDM_re), is expressed as follows (12):

$$y_{it} = \alpha + \rho W y_{it} + \beta_k x_{k_{it}} + \\ + \theta W x_{it} + \mu_i + \varepsilon_{it} \quad (12)$$

5. The generalized spatial panel random-effects model (GSPRE) is represented by the following specification (13):

$$y_{it} = \rho W y_{it} + \alpha + \beta_k x_{k_{it}} + \theta W x_{it} + \\ + \mu_i + \lambda W u_{it} + \varepsilon_{it} \quad (13)$$

where:

y_{it} – the dependent variable for town *i* at time *t*;

$x_{k_{it}}$ – the independent variable for town *i* at time *t*;

β_k – coefficients for independent variables;

α – the free term;

μ_i – individual effects of cities (fixed or random);

ε_i – residuals (random errors);

$\rho W y_{it}$ – the spatial lag of the dependent variable *y* it;

$\lambda W u_{it}$ – the spatial lag of the residuals in the model;

$\theta W x_{it}$ – the spatial lag of the independent variable x_i.

The focal empirical specification is the panel Spatial Durbin model with entity fixed effects (SDM_fe1), including spatial lags of CIGR and HHIwT alongside ITGR, HHIciFA and the predetermined concentration lags. SAR, SEM, SAC, alternative SDM specifications, pooled FE/RE and GSPRE models are estimated for comparison, taking into account the results of the Lagrange multiplier tests.

DATA

Data were obtained from the SPARK information and analytical system, which provides financial statements of registered legal entities, primarily limited liability companies. Enterprises were classified into creative industries and ICT activities using OKVED (All-Russian Classification of Economic Activities), while their territorial location was identified using OKATO (All-Russian Classification of Administrative-Territorial Entities). To test the research hypothesis, a database covering single-industry towns and administrative centres in the Far Eastern Federal District was compiled. The final dataset comprises a balanced panel of 26 settlements over the period 2013–2022 (10 years), providing 260 annual observations.

The sample includes nine administrative centres: Vladivostok, Magadan, Ulan-Ude, Khabarovsk, Chita, Yakutsk, Birobidzhan, Blagoveshchensk and Petropavlovsk-Kamchatsky; and 17 single-industry towns: Arsenyev, Artem, Belogorsk, Dalnegorsk, Krasnokamensk, Lipovtsy, Luchegorsk, Mirny, Neryungri, Pevek, Raichikhinsk, Svetlogorye, Svobodny, Severobaikalsk, Spassk-Dalny, Tynda and Yaroslavsky. Figure 4 presents the spatial distribution of the selected settlements and creative-industry dynamics in 2022.

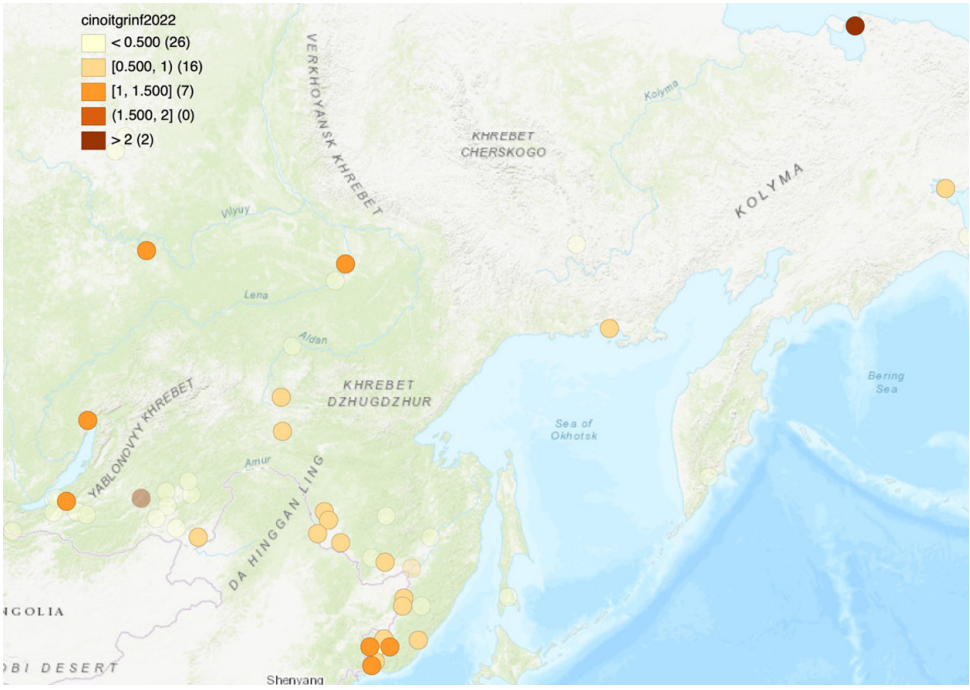


Figure 4. Spatial distribution of creative-industry dynamics in resource-based and single-industry towns and administrative centres of the Russian Far East in 2022

Visual analysis of descriptive statistics shows that the dynamics of revenue in the creative industries, adjusted for the rate of inflation, are generally evenly distributed. The concentration of

creative industries in single-industry and resource-based towns in the Far Eastern Federal District is associated with the established settlement system mainly in the southern part of the microregion, in Primorsky Krai. A list of single-industry cities is presented in Table 1.

Table 1. Resource-based and single-industry towns of the Russian Far East included in the study for 2013–2022

No.	Town / Settlement	Region	Main economic activity
1	Arseniev	Primorsky Krai	Aerospace, mechanical engineering
2	Artem	Primorsky Krai	Thermal power engineering
3	Belogorsk	Amurskaya oblast	railway
4	Dalnegorsk	Primorsky Krai	mining
5	Krasnokamensk	Zabaikalsky Krai	uranium mining
6	Lipovtsi	Primorsky Krai	Coal mining
7	Luchegorsk	Primorsky Krai	Thermal power engineering
8	Mirniy	Respublika Saha (Yakutiya)	Diamond mining
9	Nerungri	Respublika Saha (Yakutiya)	Coal mining
10	Pevek	Chukitsky Avtonomny Okrug	Seaport
11	Raichihinsk	Amursk oblast	Coal mining
12	Svjatogorie	Primorsky Krai	Extraction and processing of tungsten ore
13	Svobodniy	Amurskaya oblast	Railway, gas transportation
14	Severobaikalsk	Respublika Burjatia	Railway
15	Spassk-Dalniy	Primorsky Krai	Mining, processing, and cement production
16	Tynda	Amurskaya oblast	Railway, mining
17	Yaroslavskiy	Primorsky Krai	Coal mining

Note: compiled by the authors

Table 1 presents 17 single-industry and resource-dependent settlements in the Russian Far East included in the study. The largest number of them are located in Primorsky Krai (8). The local economy is primarily based on the extractive industry, energy, mechanical engineering, and railway transport. Differences in sectoral specialization make it possible to examine the development of creative industries in cities with different structures of traditional economic activity.

Information and communication activities also demonstrate positive average dynamics, although ITGR exhibits substantially greater variation across settlements and years. Previous research suggests that creative industries in single-industry towns of the Urals and Siberia tend to reproduce the concentrated structure of local economies rather than develop through diversification (Antonova, 2025; Antonova & Pchelintsev, 2023). The dynamics of information and communication activities are growing (Table 2).

Table 2. Data descriptive statistics

Variable	Variation	Mean	Std. dev.	Min	Max	Sample size
CI_{GR}	overall	1.252939	1.534527	0	18.12744	260
	between		.4318643	.6072397	2.6868	26
	within		1.474702	-1.25103	16.69358	10
IT_{GR}	overall	1.111879	9.329303	0	150.4818	260
	between		3.098206	0	16.07848	26
	within		8.818762	-14.10617	135.5152	10
$HHI_{CI-FA}(t-1)$	overall	.4845704	.3726349	0	1	260
	between		.3176781	0	1	26
	within		.2035787	-.4062058	1.38457	10
$HHI_{W}(t-3)$	overall	.2718117	.2887948	0	1	260
	between		.1954764	.02627	.7669514	26
	within		.2156831	-.4951398	.9767382	10

Note: compiled by the authors

In this case, the concentration of fixed assets in creative industries is considered a factor in their growth, with an average level of 0.48, a maximum of 1, and a minimum of 0. The concentration of wages, with an average level of 0.27, indicates that, in general, small and medium-sized businesses are developing in single-industry and resource-rich cities of the Far East, reflecting wages in reporting.

RESULTS

At the first stage, a comparative assessment of panel regression models was carried out, considering the spatial dependence between the cities under study. Based on the comparison results, the spatial Durbin model with fixed effects (SDM_fe1) yielded the lowest AIC (913.0) and BIC (934.4) values. This model was used for further analysis of the factors influencing the development of creative industries and for assessing spatial effects. Appendix 1 presents the detailed regression results.

Panel fixed-effects Granger-style tests of temporal precedence are reported for the core variables, with primary focus on the relationship between IT_{GR} and CI_{GR}. For lag orders 1 and 2, the null that lagged IT_{GR} does not predict CI_{GR} is rejected at the 10% level ($p \approx 0.08$ for order 1; joint test $p \approx 0.07$ for orders 1–2). The reverse specification, from lagged CI_{GR} to IT_{GR}, does not yield a significant result ($p \approx 0.14$ for order 1). Predetermined lags of HHI_{CIFA} and HHI_{W} are constructed from the extended SPARK panel beginning in 2010; sensitivity to alternative wage-concentration lags of order t−1, t−2 and t−3 (with HHI_{CIFA} held at t−1) indicates selection of the t−3 specification by AIC, BIC and the Hannan–Quinn criterion. Auxiliary FE robustness checks for skewed growth ratios leave the signs of HHI_{CIFA} and HHI_{W} unchanged under 1%/99% winsorization; the IT_{GR} coefficient is more sensitive to the extreme Ulan-Ude 2013 observation.

The analysis revealed statistically significant positive coefficients for the concentration of fixed assets in the creative industries (HHI_{CIFA}) and the growth rate of information technology (IT_{GR}). However, the impact of information technology was substantially weaker compared to the effects of path dependency. Path dependency, reflected in the self-similar nature of the creative industries' system, manifests through the spatial concentration of fixed assets (HHI_{CIFA}) and wages (HHI_{W}). Evidence for this spatial pattern is provided by statistically significant variables in the SDM_fe1 model, as well as a significant global Moran's.

The local Moran's I index was estimated to identify spatial growth poles within the creative industries. The analysis focused on statistically significant high values of the local Moran's I index, surrounded by high and low values. In resource-based and single-industry towns in the Far East, factors influencing creative-industry development show spatial heterogeneity, while the dynamics of these industries tend to be spatially homogeneous. The ICT growth points in the space of resource-based and single-industry cities of the Far East are formed in the regional centers of Ulan-Ude ($Lisa_{2017}$= $Lisa_{2018}$=0.341) and Chita ($Lisa_{2017}$=0.244 and $Lisa_{2018}$=0.252), as well as in Krasnokamensk ($Lisa_{2017}$= 0.166 and $Lisa_{2018}$=0.114) (Zabaikalsky Krai) and Severobaikalsk ($Lisa_{2017}$=0.099 and $Lisa_{2018}$=0.113) (Republic of Buryatia). These observations are predominantly in the first quadrant of the Moran scatter plot, indicating high-high spatial autocorrelation, with high values clustered among similarly high values of the parameter under consideration. A high level of concentration of fixed assets in creative industries is observed in Luchegorsk ($Lisa_{2016}$= 0.480 and $Lisa_{2017}$=0.378, I quadrant of the scattering matrix), Svetlogorye ($Lisa_{2017}$=0.380, I quadrant of the scattering matrix) and Spassk-Dalniy ($Lisa_{2016}$=-0.493 and $Lisa_{2017}$=-0.602, IV quadrant of the scattering matrix) (Primorsky Krai). The concentration of wages across the town has a high value, surrounded by high or low values of resource-based and single-industry cities in Dalnegorsk ($Lisa_{2019}$=0.208), Luchegorsk ($Lisa_{2019}$=1.236), Svetlogorye ($Lisa_{2019}$=1.225) (Primorsky Krai) and Severobaykalsk ($Lisa_{2019}$=-0.187) (Republic of Buryatia).

Table 3 presents the assessment of spatial indirect effects (spillover effects) within the studied area of the Far East.

Table 4. Spatial effects of the models

Effect	Variable	sar_fe	sar_re	sdm_re	sdm_fe	sdm_re1	sdm_fe1
Direct	IT_{GR}	0.023**	0.023**	0.018*	0.019*	0.021**	0.020**
		(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
	HHI_{ciFA}	1.221***	0.677***	0.622***	1.089***	0.635***	1.131***
		(0.417)	(0.238)	(0.234)	(0.418)	(0.233)	(0.409)
	HHI_{wT}	-0.397	-0.519*	-0.214	0.197	-0.194	0.215
		(0.404)	(0.312)	(0.325)	(0.448)	(0.324)	(0.445)
Indirect	IT_{GR}	0.015	0.014	-0.075	-0.045	0.006	0.007
		(0.010)	(0.009)	(0.084)	(0.089)	(0.006)	(0.007)
	HHI_{ciFA}	0.825	0.397	0.319	0.304	0.165	0.389
		(0.543)	(0.246)	(1.312)	(1.838)	(0.167)	(0.349)
	HHI_{wT}	-0.220	-0.288	-3.108***	-3.133***	-2.797***	-2.933***
		(0.285)	(0.221)	(0.952)	(1.050)	(0.793)	(0.851)
Total	IT_{GR}	0.038**	0.037**	-0.056	-0.026	0.026*	0.027*
		(0.018)	(0.018)	(0.088)	(0.092)	(0.014)	(0.014)
	HHI_{ciFA}	2.047**	1.074**	0.942	1.393	0.800**	1.520**
		(0.851)	(0.431)	(1.320)	(1.934)	(0.329)	(0.654)
	HHI_{wT}	-0.617	-0.807	-3.322***	-2.936***	-2.991***	-2.719***
		(0.659)	(0.498)	(0.947)	(1.063)	(0.771)	(0.820)

Note: compiled by the authors

The spatial econometric models, based on a matrix of inverse distances between resource-based and single-industry towns by road, showed the so-called indirect effect of wage concentration on the dynamics (its decrease) of creative industries in nearby resource-based and single-industry towns. The observed high-wage concentration is characteristic of resource-based and single-industry towns, where wage data is predominantly reported by large, town-forming enterprises. This study demonstrates the ability to assess the spatial influence of institutional factors, specifically the entrepreneurial climate, on creative industries. Results indicate that in resource-based and single-industry towns where a town-forming enterprise predominantly reports wage data, a negative spatial spillover effect is observed, leading to reduced creative industry dynamics in closely located neighboring towns. However, within the town itself, this effect is not observed; instead, wage concentration generally enhances creative-industry dynamics. A convergence of creative industries is observed in resource-based and single-industry towns where the business climate enables these industries to potentially underreport wages by leveraging their status as small and micro businesses. This facilitates spatial dependence as inertia of the prevailing technological order. The statistically indistinguishable-from-zero direct effect suggests that internal transparency alone cannot overcome the structural lock-in of a legacy mono-town. Conversely, the significant indirect effect captures the cross-border diffusion of uncertainty generated by neighboring legacy systems.

DISCUSSION

The findings contribute to the literature on regional economic development by examining the role of creative industries in the renewal of established development paths in remote resource-based and single-industry towns of the Russian Far East. Combining Porter's cluster approach with the theory of technological paradigm shifts (Porter, 1998; Perez, 2002; Pilyasov & Kotov, 2024) provides a basis for understanding the relationship between technological change and the existing industrial structure of these settlements. The results indicate that the development of creative industries is associated with both ICT growth and the concentration of fixed assets within the creative sector. This finding is consistent with earlier evidence that creative industries in single-industry towns may reproduce the concentrated economic structures characteristic of their local economies (Antonova, 2025; Antonova & Pchelintsev, 2023).

Previous studies have examined creative industries primarily in relation to urban

diversification, cultural assets and local identity (Evans, 2009; Florida, 2017; Zeng et al., 2020). The present research adds another dimension by considering the economic relationships between ICT activities and other creative industries in remote industrial settlements. The positive coefficient of ITGR indicates that ICT revenue growth is associated with the development of non-ICT creative industries. At the same time, the positive relationship between fixed-asset concentration and creative-industry growth suggests that the development of these activities does not necessarily follow a diversification pattern. This finding is particularly relevant to single-industry towns, where established economic specialization continues to influence the emergence of new activities.

An important result concerns the spatial effect of wage concentration. While its direct effect within individual settlements is statistically insignificant, the negative indirect effect indicates that higher wage concentration is associated with slower creative-industry growth in neighbouring settlements. This relationship may reflect the persistence of established economic structures across geographically connected towns. However, wage concentration should not be interpreted as direct evidence of institutional weakness or informal business practices, since these characteristics were not measured separately in the study.

The distinction between ICT and other creative industries also contributes to the discussion of creative new industrialization. Existing classifications commonly include digital activities within the broader creative sector (Fahmi et al., 2017; Florida, 2017; Tao et al., 2019). By examining ICT separately, this study identifies its relationship with the development of other creative activities and provides additional empirical evidence for considering digital technologies within the framework of new industrialization. The results suggest that opportunities for path renewal in remote resource-based settlements are associated not only with technological development but also with the existing structure of local economic activity and spatial relationships between settlements.

CONCLUSION

The findings of this study support the following conclusions. Firstly, the findings provide confirmation of the research hypothesis: resource-based and single-industry towns of the Far Eastern Federal District in Russia are capable of pursuing creative new industrialization by relying on information and communication activities, even under the substantial influence of path dependence and the spatial factor of transport accessibility. Secondly, this study has identified specific factors influencing the development of creative industries within the Far Eastern Federal District of Russia. Spatial heterogeneity in ICT dynamics is observed in Ulan-Ude, Chita, Krasnokamensk (Zabaikalsky Krai), and Severobaikalsk (Republic of Buryatia). Fixed-asset concentration in creative industries is observed in Luchegorsk, Svetlogorye, and Spassk-Dalny (Primorsky Krai). Wage concentration is observed in Dalnegorsk, Luchegorsk, and Svetlogorye (Primorsky Krai), and Severobaikalsk (Republic of Buryatia). The dynamics of creative industries, conversely, exhibit a spatially neutral response to the influence of locally differentiated factors. Thirdly, a negative spillover effect was observed, whereby the dynamics of creative industries decrease in proximity to single-industry towns characterized by higher wage concentration.

Nevertheless, this study's findings are subject to inherent limitations arising from the selection of resource-based and single-industry towns and regional centres, potentially restricting the generalizability of the results to a broader range of settlements. While a more diverse sample might reveal additional development factors influencing spatial patterns, the homogeneity of the selected settlements facilitated the identification of nuanced relationships and spatial variations amenable to regression modelling, which may not be discernible in a more heterogeneous urban landscape.

The estimation sample is a balanced panel of 26 settlements over ten annual waves (2013–2022), which limits the lag depth and effective degrees of freedom available for dynamic panel diagnostics. The temporal structure among CIGR, ITGR and the concentration measures is modelled using predetermined HHICIFA and HHIW lags (constructed from SPARK data beginning in 2010) and complementary entity fixed-effects Granger-type regressions reported in the Results section. The three-year lag for wage concentration was selected from the set of alternative lags (t−1, t−2 and t−3) using AIC, BIC and the Hannan–Quinn criterion

(with HHICIFA held at t−1), and the spatial wage-concentration spillover coefficients were compared across these alternative lag orders.

AUTHOR CONTRIBUTIONS

Conceptualization and theory: IA; research design: IA; data collection: IA; analysis and interpretation: IA; writing draft preparation: IA; supervision: IA; correction of article: IA; proofread and final approval of article: IA. All authors have read and agreed to the published version of the manuscript.

REFERENCES

Antonova, I. S. (2025). The concept of creative new industrialization in the spatial socioeconomic development of single-industry towns in the Urals and Siberia. *R-Economy 11*(1), 22–48. https://doi.org/10.15826/recon.2025.11.1.002

Antonova, I. S., & Pchelintsev, E. A. (2023). Econometric Modeling of Creative Industries Concentration Process in the Siberian and the Urals Single-Industry Towns. *Mathematics 11*(17), 3704. https://doi.org/10.3390/math11173704

Aoyama, Y., Malecki, E. J., Glasmeier, A., Christopherson, S., & Storper, M. (2015). Keys to the City: How Economics, Institutions, Social Interaction, and Politics Shape Development. *The AAG Review of Books*, *3*(2), 92–98. https://doi.org/10.1080/2325548X.2015.1015921

Boal-San Miguel, I., & Herrero-Prieto, L. C. (2020). A Spatial–Temporal Analysis of Cultural and Creative Industries with Micro-Geographic Disaggregation. *Sustainability, 12*(16), 6376. https://doi.org/10.3390/su12166376

Capello, R. (2008). Regional economics in its 1950s: recent theoretical directions and future challenges. *The Annals of Regional Science, 42,* 747–767. https://doi.org/10.1007/S00168-007-0185-8

Capello, R., & Nijkamp, P. (2009). *Handbook of regional Growth development theories*. Edward Elgar.

Czamanski, D., Broitman, D. (2018). The life cycle of cities. Habitat International 72, 100–108. https://doi.org/10.1016/j.habitatint.2016.09.002

DCMS. (1998). *Creative Industries Mapping Documents 1998*. https://www.gov.uk/government/publications/creative-industries-mapping-documents-1998

DCMS. (2001). *Creative Industries Mapping Documents 2001*. https://www.gov.uk/government/publications/creative-industries-mapping-documents-2001

Evans, G. (2009). Creative Cities, Creative Spaces and Urban Policy. *Urban Studies, 46*(5–6), 1003–1040. https://doi.org/10.1177/0042098009103853

Fahmi, F. Z., McCann, P., & Koster, S. (2017). Creative economy policy in developing countries: The case of Indonesia. *Urban Studies, 54*(6), 1367–1384. https://doi.org/10.1177/0042098015620529

Florida, R. (2017). *The New Urban Crisis: How Our Cities Are Increasing Inequality, Deepening Segregation, and Failing the Middle Class—and What We Can Do About It*. Basic Books.

Foord, J. (2013). The new boomtown? Creative city to Tech City in east London. *Cities, 33,* 51–60. https://doi.org/10.1016/j.cities.2012.08.009

Glazyev, S. T. (2009). The global economic crisis as a process of technological shifts. *Problems of Economic Transition 52*(5), 3–19. https://doi.org/10.2753/PET1061-1991520501

Gushchina, E. G., & Tarabanova, E. V. (2022). Creative industries: New capabilities for the development of Russian cities and regions. *Journal of Volgograd State University. Economics, 24*(1), 91–104. https://doi.org/10.15688/ek.jvolsu.2022.1.9 (in Russ.)

Hayter, R. (2017). Single industry resource towns. In E. Sheppard & T. J. Barnes (Eds.), *A Companion to Economic Geography* (pp. 290–307). Blackwell Publishing. https://doi.org/10.1002/9781405166430.ch18

He, J.-L., & Gebhardt, H. (2014). Space of Creative Industries: A Case Study of Spatial Characteristics of Creative Clusters in Shanghai. *European Planning Studies, 22*(11), 2351–2368. https://doi.org/10.1080/09654313.2013.837430

He, S. Y., Lee, J., Zhou, T., & Wu, D. (2017). Shrinking cities and resource-based economy: The economic restructuring in China's mining cities. *Cities, 60*, 75–83. https://doi.org/10.1016/j.cities.2016.07.009

Hu, X. (2024). Institutional change and divergent economic resilience: Path development of two resource-depleted cities in China. In *Uneven Economic Resilience of Old Industrial Cities in China: A Multiple-Perspective Analysis* (pp. 121–140). Springer Nature Singapore. https://doi.org/10.1007/978-981-99-9279-9_7

Kitchin, J. (1923). Cycles and Trends in Economic Factors. *The Review of Economics and Statistics, 5*, 10. https://doi.org/10.2307/1927031

Kourtit, K., & Nijkamp, P. (2019). Creative actors and historical–cultural assets in urban regions. *Regional Studies, 53*(7), 977–990. https://doi.org/10.1080/00343404.2018.1541077

Kuznets, S. (1940). Schumpeter's Business Cycles. *American Economic Review, 30*, 257–271.

Li, F. (2020). The digital transformation of business models in the creative industries: A holistic framework and emerging trends. *Technovation, 92–93,* 102012. https://doi.org/10.1016/j.technovation.2017.12.004

Madalin, A., & Andreica, A. (2023). The new industrial revolution - industry 4.0 concept. An overview of the empirical investigations on manufacturing industries. *Interciencia, 48*(10), 17-28. https://doi.org/10.59671/viDcZ

Markusen, A. (1985). Profit cycles, oligopoly, and regional development. The MIT Press.

Martin, R. (2017). Institutional approaches in economic geography. In E. Sheppard & T. J. Barnes (Eds.), *A Companion to Economic Geography* (pp. 77–94). Blackwell Publishing. https://doi.org/10.1002/9781405166430.ch6

Muraya, P. W. K. (2006). Urban planning and small-scale enterprises in Nairobi, Kenya. *Habitat International, 30*(1), 127–143. https://doi.org/10.1016/j.habitatint.2004.08.002

Pani, N. (2009). Resource cities across phases of globalization: Evidence from Bangalore. *Habitat International, 33*(1), 114–119. https://doi.org/10.1016/j.habitatint.2008.05.007

Perez, C. (2002). *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*. Edward Elgar Publishing. https://doi.org/10.4337/9781781005323

Pilyasov, A. N., Kotov, A. V. (2024). Russian Arctic-2035: Multi-Scale Forecast. Economy of Regions 20(2), 369–394. https://doi.org/10.17059/ekon.reg.2024-2-3

Pistorius, C. W. I., & Utterback, J. M. (1997). Multi-Mode Interaction Among Technologies. *Research Policy, 26*(1), 67–84. https://doi.org/10.1016/S0048-7333(96)00916-X

Porter, M. E. (1998). Clusters and the new economics of competition. *Harvard Business Review, 76*(6), 77–90.

Pregi, L., & Novotný, L. (2025). Spatial Autocorrelation Methods in Identifying Migration Patterns: Case Study of Slovakia. *Applied Spatial Analysis and Policy, 18*(1), 1–21. https://doi.org/10.1007/s12061-024-09615-5

Priemus, H. (2004). The path to successful urban renewal: Current policy debates in the Netherlands. *Journal of Housing and the Built Environment, 19*(2), 199–209. https://doi.org/10.1023/B:JOHO.0000030676.92292.62

Stam, E., de Jong, J.P., & Marlet, G. (2008). Creative industries in the netherlands: structure, development, innovativeness and effects on urban growth. *Geografiska Annaler: Series B, Human Geography, 90*, 119 - 132. https://doi.org/10.1111/j.1468-0467.2008.00282.x

Swords, J. (2013). Michael Porter's cluster theory as a local and regional development tool: The rise and fall of cluster policy in the UK. *Local Economy: The Journal of the Local Economy Policy Unit, 28*, 369 - 383. https://doi.org/10.1177/0269094213475855

Tao, J., Ho, C., Luo, S., & Sheng, Y. (2019). Agglomeration economies in creative industries. *Regional Science and Urban Economics, 77*, 141-154. https://doi.org/10.1016/J.REGSCIURBECO.2019.04.002

Turgel, I., Derbeneva, V., & Baskakova, I. (2023). Conceptual Approach to Managing the Development of Creative Industries in Second-Tier Industrial Cities. *R-Economy, 9*(4), 366–383. https://doi.org/10.15826/recon.2023.9.4.023

UNCTAD. (2024). *Creative Economy Outlook 2024: Technical and Statistical Report*. United Nations. https://unctad.org/system/files/official-document/ditctsce2024d2_en.pdf

Van Geenhuizen, M., Nijkamp, P. (2012). *Creative cities in a knowledge society: introduction*. Edward Elgar Publishing. https://doi.org/10.4337/9780857932853.00006

Wan, L., Ye, X., Lee, J., Lu, X., Zheng, L., & Wu, K. (2015). Effects of urbanization on ecosystem service values in a mineral resource-based city. *Habitat International, 46,* 54–63. https://doi.org/10.1016/j.habitatint.2014.10.020

Ye, Z., Ma, L., Jin, F. (2024). Yesterday's solution: Do national economic and technological development zones promote industrial development in typical developing regions of China? *Habitat International, 152*, 103156. https://doi.org/10.1016/j.habitatint.2024.103156

Zamyatina, N., & Pilyasov, A. (2016). Single-Industry Towns of Russia: Lock-In and Drivers of Innovative Search. *Foresight and STI Governance, 10*(3), 53–64. https://doi.org/10.17323/1995-459X.2016.3.53.64

Zeng, M., Wang, F., Xiang, S., Lin, B., Gao, C., & Li, J. (2020). Inheritance or variation? Spatial regeneration and acculturation via implantation of cultural and creative industries in Beijing's traditional compounds. *Habitat International, 95,* 102071. https://doi.org/10.1016/j.habitatint.2019.102071

Zielke, P., & Waibel, M. (2014). Comparative urban governance of developing creative spaces in China. *Habitat International, 41,* 99–107. https://doi.org/10.1016/j.habitatint.2013.06.007

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