ECONOMICS

WORKING

PAPERS

VOLUME 4

NUMBER 2

2020

ISSN 1804-9516 (Online)

ECONOMICS WORKING PAPERS

Volume 4 Number 2 2020

Publisher: University of South Bohemia in České Budějovice
Faculty of Economics

Reviewers: prof. Ing. Věra Bečvářová, CSc.
Mendel University of Brno
Faculty of AgriSciences
Department of Regional and Business Economics

RNDr. Jiří Dvořák, Ph.D.
Charles University
Faculty of Mathematics and Physics
Department of Probabilty and Mathematical Statistics

Edition: 4, 2020

ISSN: 1804-9516

ECONOMICS WORKING PAPERS

ECONOMICS WORKING PAPERS. Published by Faculty of Economics. University of South Bohemia in České Budějovice• The editor's office: Studentská 13, 370 05 České Budějovice, Czech Republic. Contact: tel: 00420387772493, Technical editor: Martina Matějčková, e-mail: mmatejckova@ef.jcu.cz • ISSN1804-5618 (Print), 1804-9516 (Online)

SPATIAL ANALYSIS OF FINANCIAL HEALTH OF COMPANIES

Berková, I.

Abstract

The aim of the paper was to describe the literature overview of companies' location in the context of the economy and the assessment of companies' performance. Then there is the introduction of a new statistical methodology for the description of the location of companies because the location of companies is one of the most important factors which ensures the future successful development of a company. The methodology can be applied for the evaluation of companies' location and could answer the question of where it is better to place a new company. To tackle the location of companies, the local population and the health of companies was taken into account. The methodology is based on a point process. Since the population is unevenly distributed and companies choose their locations according to the size of the local population, it was not possible to use homogeneous models and thus the local scaling principals were used for modeling the inhomogeneity. For the evaluation of the health of companies, Neumeiers' indices were taken into account.

Keywords:

Location theories, Clustering, Health of companies, Local scaling, L-function, Global envelope test

JEL Classification:

C21, O18, R12

Content

1. Introduction

The location of a company is one of the most important determinants which ensures the future successful development of the company. Every company must take into account a number of internal and external factors that are influenced by companies, households and the public sector. The optimal combination of these factors leads to optimal localization, therefore, it is important to understand these economic factors. That's why the location of corporate activities has been a part of economics for many years. The theories and methodologies that are focused on this problem are part of regional economics.

Choosing a business location is one of the most crucial business decisions along with the choice of a legal form of business or determination of the construction of a business. It is a long-term decision that cannot be repeatedly revised, especially in the case of large enterprises. A poorly chosen location significantly reduces the chances of a newly established business to survive.

The main aim of the paper is to describe the literature overview of companies' location in the context of economy and the assessment of companies' performance and introduce a methodology for the evaluation of the position of companies. Concretely, there is introduced the methodology for the description of the positions of individual companies (whether they tend to cluster or vice versa) and a way to identify a level of clustering (how strong is the tendency of clustering). Then, there is introduced a new statistical methodology, which can be applied for the evaluation of companies' location and could answer the question of where it is better to place a new company. The company's location is considered to be its headquarters and to tackle its location the local population and the health of companies were taken into account in the creation of the methodology.

The paper is divided into 4 main chapters. In the first chapter, "Introduction", there is contained the brief outset of the papers' topic. In the chapter, "Literary Overview", there is described theory related to the problem of location theories (regional economics, clustering, location theories, and their development) and performance assessment of companies, specifically Neumeiers' indices. The chapter, "Methodological frameworks", contains the methodology for the investigation of the location of companies in a given area. At the end of the paper, there is the conclusion that summarizes the topic.

2. Literary Overview

Different economic activities benefit from different areas. For this reason, it is necessary to pay attention to regional sciences, which take into account the influence of location on economic activities.

2.1 Regional economics

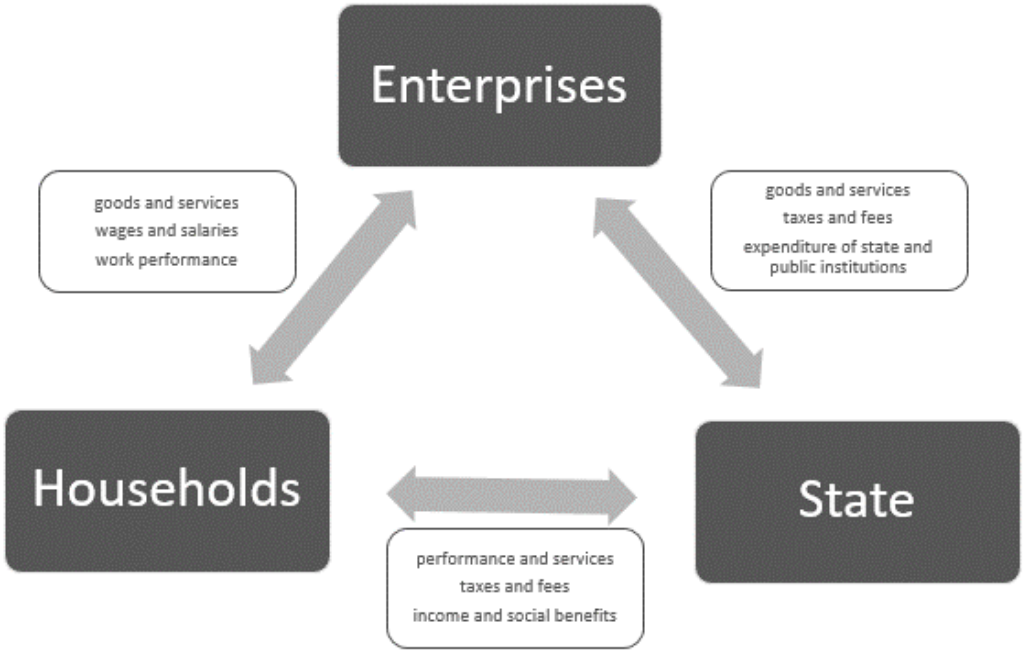
Regional economics is a summary of statements and findings of the socio-economic spatial structure. The aim of regional economics is to explain and predict economics events in space and to shape regional economic reality (Ježek et al., 2002). According to Edwards (2007), regional economics helps to determine where different types of economic activity will prosper. He claims that regional economics combines tools from microeconomics, macroeconomics, and international economics to analyze location patterns and other components of regional growth rates. Regional economics focuses on proximity and transportation costs, increasing returns to scale and externalities. Urban economists, on the other hand, are interested in the relation of the peripheral urban areas to the city itself as well as land use patterns within a city. Urban economists are particularly focused on land use, land rents, local government and local education policies, and housing, as well as social problems relating to poverty and crime.

Regional economics can be divided into regional macroeconomics and regional microeconomics. Regional macroeconomics compares the economic performance of a selected number of regions with the national economy, deals with the economic growth of regions, inter-regional differences in unemployment and inter-regional movement of production factors. In contrast, regional microeconomics is much more concerned about the localization and interaction of individual economic activities (Ježek et al., 2002).

Spatial decision-making is the result of many actors. There are many authors who have dealt with the issue of actors of regional development. In the Czech Republic, for example Pospíšilová and Vajdová (2007) or Stachová et al. (2007) have dealt with this problem. They divided major actors into public sector institutions, private sector institutions, and civil society. The most widely differentiation of the actors is divided into three main groups, enterprise, household, and state (public sector) groups according to Ježek et al. (2002); see in the figure below. The most important consideration of companies is where business activities will be realized. Households, as final consumers of goods and services, labor supply, entrepreneurial activities and capital, influence regional structures in their decision-making. The public sector

makes spatial decisions for things such as tax collection, infrastructure, provision of public facilities, law-enforcement, institution-building, etc.

Figure 1 Actors of regional development



Source: Own processing according to Ježek et al. (2002)

According to Ježek et al. (2002), the object of exploration of spatial economics is an economic spatial system consisting of three basic elements:

1. the distribution of economic activities,
2. movement of production factors,
3. dynamics of inhabitant structure and regional structure.

The economic activities of individual regions are directly influenced by regional policy. There is no exact definition for the concept of regional policy. The definition varies for many authors. For example, Wokoun (2003) briefly defines regional policy as a set of objectives, measures and tools to reduce excessively large socio-economic disparities across regions. According to Ježek et al. (2002), regional policy is defined as a form of government economic policy aimed at changing the deployment of economic activities and changing the performance of regions' economies. It is about influencing economic processes in partial spatial state units through public administration (state administration and self-government). In particular, economic, social and environmental reasons exist for the existence of the regional policy.

Regional politics represents all public interventions that lead to the improvement of the geographical distribution of economic activities, respectively, to try to correct some of the spatial consequences of a free market economy for achieving two interdependent goals - economic growth and improvement of the social distribution of economic effects (Vanhove, 2018).

The main objective of regional politics is to reduce disparities between regions, harmonious development of regions, creation of common financial resources and their effective spending. In particular, the policy puts emphasis on economic growth and development (Stejskal, Kovárník, 2009). Wokoun et al. (2008) argue that regional policy objectives are based on the identification of the main regional problems and on the concept of economic policy, whereby they are defined as far as possible in order to control their fulfillment and simultaneously evaluate the effectiveness of the used tools.

Regional problems/differences can be caused by a number of economic and non-economic factors. The principal factors are mainly factors related to economic theories, namely the relatively low mobility of labor and capital and geographical factors, especially the geographical remoteness and insufficient natural resources. Other important factors are, for example, the inadequate economic structure of the region, institutional factors and psychological factors. Secondary factors such as the external economy (technical, financial, and infrastructural), the demographic situation (lower level of education), the rigidity of costs and prices, the wide range of regional uniformity of wages for certain important inertia forces, the wide range of regional wage uniformity for certain qualifications groups, regional differences in innovation and a number of other factors of a different nature contribute to uneven regional development (Wokoun et al., 2008).

The main actor involved in regional policy in the Czech Republic is the state and the Ministry for Regional Development. However, in recent years, a number of actors such as the European Union, regional development funds and agencies, advisory and technology centers, etc. have been increasing (Ježek et al., 2002).

2.2 Region

Over the past 100 years, Urban and Regional Economics have developed enormously, but despite this development, there has been no clear definition of the fundamental concept of the region yet.

The term region can be defined as a territory within a different territorial delimitation. The primary issue of regional economic concerns the appropriate delineation of a region. Siebert (1969), for example, defined a region as a „subsystem of a national economy". According to the Law Regional Development Support No. 248/2000 Coll., a territorial unit is defined by the administrative boundaries of regions, districts, municipalities or associated municipalities whose development is supported.

Regions are defined as territorial units that have certain solidarity that is determined by the criterion of homogeneity or functionality. In the homogeneity criterion, territorial units are assigned to each other, according to the similar economic indicators. In the criterion of functionality, territorial units are associated according to strong spatial links. These criteria are not mutually exclusive (Ježek et al., 2002).

Differences or inequalities are generally a major stimulus for social development, and their existence is desirable and necessary. On the other hand, too large differences between regions (similarly between individuals) cease to be stimulating and can have unpleasant economic and serious social and political consequences and are therefore generally considered as the negative thing. At the same time, regional inequalities are a prerequisite for more effective forms of territorial division of labor and specialization (Wokoun et al., 2008).

The literature describes many types of regions′ typologies according to a variety of criteria. One of the most cited classifications is typology (Blorevogel, 2000), which distinguishes the following types of regions:

- real regions,
- regions defined by human activities,
- regions that are perceived or identified as regions.

Real Regions, Blorevogel (2000) defines as regions of scientific constructions that serve the scientific organization of reality that is constructed based on a purpose or theory. Regions defined by human activities are created by the daily actions of individual or collective actors. The last type of region is created through social communication.

The typology of regions by Wokoun et al. (2008) is based on Blorevogel (2000)′s typology. Wokoun et al. (2008) claims that there are descriptive regions that are defined by situational analysis based on the occurrence of representative phenomena or functions. Furthermore, according to these authors, there are normative regions that arise from political decisions based

on legislation or executive requirements. There is no uniform methodology for defining descriptive regions. It depends primarily on the purpose of the delimitation, the nature of the quantities (e.g. qualitative, quantitative) and the availability of necessary data. One possible approach is, for example, cluster analysis (Matoušková, 2000).

According to Edwards (2007), there are two categories of regions, i.e. functional (operational) and administrative (political). The administrative regions are determined by political subdivisions and often become the area in which policy decisions are implemented. Ideally, but rarely, these categories signify the same geographic area.

However, economics mostly defines three types of regions: supranational, transnational and sub-national, where the first two are distinguished by currency, laws and customs regulations, while sub-national regions are characterized by these institutions shared with other regions of the country (Ježek et al., 2002).

The division of regions according to the NUTS methodology (Nomenclature of Units for Territorial Statistics) plays an important role in the European Union. The NUTS regions were established in 1988 when the EU introduced this breakdown for the needs of its Eurostat statistical office. This is mainly due to the monitoring of economic indicators and further to the evaluation of the results of the application of the regional policy of the EU Member States. NUTS units are marked with numbers indicating hierarchical order. In addition, the LAU system (Local Administrative Units) was created in parallel in 1990. These units at district and municipal levels were replaced by NUTS 4 and 5. In defining NUTS regions in the individual EU Member States, efforts were made to respect the boundaries of the original administrative units. In the Czech Republic, NUTS 3 units are individual regions, NUTS 2 are so-called "associated regions" or "cohesion regions" (Ministerstvo pro místní rozvoj České republiky, 2016).

The choice of the specific definition of a region is usually dependent on the author and his other intentions.

2.3 Clustering

The idea of clustering of economic activities in the same location generates benefits (Krugman, 1997). The term “cluster” is not new in economics and has many definitions. For example, at the end of the 19th century, clusters were engaged by Marshall (2009), who claims that the clustering was due to localization savings, the creation of a dedicated workforce supply, the transfer of knowledge and technical progress among companies.

For example, CzechInvest (2005) defines a cluster as: "*a geographically concentrated group of independent firms and affiliated institutions that compete with each other, but also cooperate with each other, and whose links have the potential to consolidate and enhance their competitiveness*".

The most well-known economist dealing with clustering is Michael Eugene Porter. According to Porter (1998a), a cluster is a critical mass of companies in a particular location (a country, state, region or even city). He claims that: "*Clusters suggest that a good deal of competitive advantage lies outside companies and even outside their industries, residing instead in the locations at which their business units are based."* (Porter, 2000).

Clusters occur in many types of industries, in smaller fields, and even in some local industries such as restaurants, car dealerships, and antique shops. They are present in large and small economies, in rural and urban areas, and at several geographic levels (e.g., nations, states, metropolitan regions, cities). Clusters occur in both advanced and developing economies, although clusters in advanced economies tend to be far more developed (Porter, 1998b). Boadway et al. (2004) claim that all economic activities tend to cluster and the clustering has an important impact on the real world.

Generally, clusters represent a collaboration between companies in a particular territory or region. Clustered companies are mutually competing with each other, on the other hand, they cooperate with each other in a certain way. The main reason for the creation of clusters is the implementation of innovations and knowledge in the business sector. Many authors agree that clustering generates benefits for the businesses. According to Stejskal and Kovárník (2009), clusters have unquestionable advantages for companies, enabling them to increase productivity by accessing specialized inputs, information, and institutions. Furthermore, they increase the innovation capacity and lead to the better strategic planning of the relevant region or bring a beneficial advantage to participating companies. For example, according to Porter (1998a), clusters increase the productivity of outsourcing or vertical integration through improving access to specialized inputs and information, facilitating complementarities among cluster participants, improving incentives and performance measurement and to lower barriers to new business formation that improve the environment for productivity. As the main advantage, he sees the role of a cluster in improving the rate and success of innovation. Also, according to Skokan (2004), enterprises achieve significant performance and competitive advantages through sectoral clustering, which they would have difficulty achieving alone. It is proven that companies in clusters benefit from symmetrical geographic agglomeration. McCann and Folta

(2011) managed to prove that the clusters bring benefits especially to new companies or ones with a higher knowledge base.

One of the biggest benefits of a cluster is the advantage of locally concentrating resources and services that firms use to do business. Compared to competing companies outside the cluster, companies concentrated in the cluster can use these resources in advance and at a lower cost. At the same time, they have greater access to banking, accounting, consulting, marketing, advertising, and other services.

However, there are also authors who claim that clustering also has its disadvantages. Baptista and Swann (1998), failed to prove this relationship significantly in their study. Their results show that if employment in a cluster is strong, the company is more likely to be innovated. On the other hand, the excess of employment in the cluster seems to cause congestion, and the disadvantages then outweigh the benefits that the cluster may have. Beaudry and Breschi (2003) were also interested in the same problem. They came to the same conclusion, namely that clustering does not lead to higher innovation performance. Lee (2009) also revealed the results that are contrary to the common dogma of cluster innovations. His results show that placement in a cluster does not actually affect R&D intensity. Swann (1998) emphasizes the agglomeration's negative impact on congestion and competition on both the input and output markets. Then he says that the positive impact of a cluster is getting smaller as the cluster grows. Also, Lazerson and Lorenzoni (1999) reported a negative consequence of cultural homogeneity in the cluster. Beaudry and Breschi (2003) claim that the effects of clustering can be basically positive or negative and can be based on demand or supply. Porter (1990) identified four basic factors as prerequisites for the emergence of cluster competitive advantages, including:

1. input factors (e.g. skilled labor, natural resources (land), capital, scientific and technological infrastructure),
2. conditions of (domestic) demand, including a sophisticated and demanding customer base, which encourages companies to continually improve, to innovate and modernize, thus preparing companies to enter the more advanced spheres,
3. related and supportive sectors, sufficiently competitive beyond national borders, to benefit even the less developed sectors, which, through their activities and presence, can support even less competitive sectors, as their outputs can serve as inputs to the less developed sectors,

4. corporate strategy, organizational structure and rivalry, supporting the successful development of entities.

Several so-called concentration factors contribute to the emergence of clusters. The main concentration factors include:

- supplier-customer ties - the stronger the ties, the more tied-up companies will tend to be in close proximity and reduce transportation costs,
- a strong market - an effort to create a strong market through clustering,
- diffusion of knowledge - easier and faster dissemination and creation of knowledge among individual cluster members (Damborský, Wokoun, 2010).

In addition to the factors supporting association, there are also deconcentration factors:

- immobility of factors - certain production factors cannot be transported and must be processed at their location (e.g. minerals, perishable materials),
- concentration costs - for example, coordination costs increase from a certain number of companies concentrated in the cluster,
- communication technology - connection of companies is sufficiently ensured by high-quality communication technology enabling fast and reliable transfer of information. This deconcentration factor is gaining momentum and in many cases outweighs the benefits of concentration (Damborský, Wokoun, 2010).

Fujita and Thisse (1996) tried to answer the question: "*Why do economic activities tend to agglomerate in a small number of places (typically cities)?*" They found out three main reasons for the clustering of economic activities:

- externalities under perfect competition,
- increasing returns under monopolistic competition,
- spatial competition under strategic interaction.

Our goal will also be to define the methodology for finding whether the proximity of other companies has an impact on the performance of the company under review.

2.3.1 Agglomeration effects

As already mentioned, the spatial structure is the result of localization decisions by businesses, households and the public sector. The spatial distribution of activities affects

localization conditions that arise from the activities of existing or newly established businesses. Agglomeration effects are those that arise from the spatial interaction of businesses, households, and the public sector.

Agglomeration effects are divided into:

- internal effects,
- external effects,
    - localization effects,
    - urbanization effects (Jennen, Verwijmeren, 2010).

Both internal and external agglomeration effects can influence both positively and negatively. In the case of a positive effect, they lead to spatial concentration; in the case of negative effect to spatial dispersion. Internal effects indicate dependence between activities that occur in a region or already exist within the enterprise. This effect is associated with the notion of revenue from scale where production expansion leads to each new production unit being produced at a lower cost than the previous one. The external effects are the agglomeration effects that arise between economic actors (businesses, households, and the public sector) and are defined as influences that determine the economic outcome of actors but are controlled by other economic operators. External effects are further divided into localization effects and urbanization effects. Localization effects arise among businesses in one industry. So they are external from the point of view of the company, but they are internal from the branch point of view. The role of localization effects depends on the size of enterprises, where many effects are localization benefits for small businesses, but for large enterprises, these are benefits of scale (Ježek et al. (2002) and Jennen, Verwijmeren (2010)).

There are many positive localization effects, such as concentration at the location of natural resources, the creation of special supplier industries, the emergence of a specialized labor market, special research and development facilities, special infrastructure, etc. For negative effects (Ježek et al., 2002) consider, for example, rising labor costs, land price increases and the associated large regional demand for factors of production. Another negative effect can be environmental damage. Rosenthal and Strange (2001) claims that the positive localization effect at all levels of geography is labor market pooling, at zip code level it is knowledge of spillovers and at state level they are reliance on manufactured inputs and natural resources.

Unlike localization effects, urbanization effects arise between businesses of different disciplines and between different activities. These are positive or negative influences that affect the results of economic entities (Ježek et al., 2002).

The positive urbanization effects can be attributed to the size of the sales market, the emergence of a large skilled labor market, the existence of manufacturing services, research and development facilities, transport infrastructure, the possibility of direct economic and social contacts with other businesses and decision-makers, the existence of specialized cultural, leisure and consumer facilities. Many of these benefits are related to the size and diversification of regional markets, and are emerging mainly in times of economic restructuring, in industries and businesses with high levels of uncertainty, and in young businesses or product businesses at an early stage of the production cycle. There are also negative urbanization effects, such as air pollution, congestion, and high production factors, due to the concentration of economic activities and the population (Ježek et al., 2002).

Many authors agree that the localization effect works together with the urbanization effect (Moomaw, 1981), (Rosenthal, Strange, 2003), (Henderson, 2003). However, Rosenthal and Strange (2003) and Henderson (2003) claim that localization effects are stronger than urbanization effects. Rubiera Morollón and Viñuela (2012) claim that each base spatial unit is dependent on the strength of the agglomeration effect and the distance to the main population center. According to research of Ciccone (2002), the agglomeration effects of Europe are only slightly lower than in the United States. Furthermore, they showed that agglomeration effects in states of Europe are not significantly different between countries.

2.4 Location theories

Ježek et al. (2002) distinguish three theoretical approaches from the perspective of spatial economics:

1. localization theory,
2. theory of spatial stability,
3. regional growth and development theories.

This research belongs to the theoretical approach of localization theory, and therefore, it is necessary to describe these theories in depth. A company and its activities must adapt to the framework conditions of its surroundings, and these relationships are tied to certain locations and influence the potential localization decisions of the company (Ježek et al., 2002). This

situation gave rise to localization theories. Localization theories are focused on the geographical location of economic activities and have become an integral part of economic geography, regional science, and spatial economics. Localization theory seeks to answer questions about where economic activities are located and for what reason. The location of economic activities can be determined at regional, metropolitan or narrow levels such as zone, neighborhood, city block or individual (The Editors of Encyclopaedia Britannica, 2014). Furthermore, these theories solve problems of who produces, whether they produce goods or services, at what point and for what reason. The emergence of these theories is influenced by the need to address how the shifts in supply impact the shift in production (North, 1955).

Due to the long-term perspective of localization decisions, localization analysis has to be worked out many years ahead, which means that it is associated with a high degree of uncertainty. Localization uncertainty may be a result of the market, technological factors or a large number of factors affecting localization decisions (Ježek et al., 2002). Furthermore, Dunning and Boyd (2003) argue that due to changes in society, light localization variables or those related to them such as living standards, minimal pollution, violence, corruption, and other unacceptable social behavior must also be taken into account.

2.4.1 Assumptions of localization theories

Most localization theories are built on these main assumptions:

- The production process for special goods is uniform, independent of location. Some locations are more suitable for crop production than others. Production factors cannot be replaced.
- Demand for production is separated from production and product offerings.
- Production factors such as land and natural resources are immobile compared to some factors such as capital, labor (North, 1955).

The theory based on these assumptions creates an estimate to minimize production and transport costs, and that localization will specialize in the production of special goods and services and the export of these goods to other locations (North, 1955).

2.4.2 Localization factors

Localization factors are the forces that influence the decisions about the location of the company in a space whereby the optimal combination of these factors can achieve an optimal location. These are facts that determine the suitability of the environment for economic

activities. Each author presents other localization determinants, which are mainly dependent on the development of the economy which changes the development of the importance of individual production factors. For about three centuries, localization theory has been trying to clarify on what basis economic activities are deployed in space. It seeks a suitable combination of factors that influence the decision-making of entities about their activities.

Localization factor for all industries

Factors influencing business start-ups and factors that affect the development of businesses already established are important in terms of setting up and dynamics for SMEs. Factors influencing business start-ups (Ježek et al., 2002) include the sectoral structure of local or regional economies, the prevailing size of enterprises, the educational level of the workforce and regional business traditions. The second group includes factors that affect the development of established businesses, such as market access and market dynamics, access to venture capital, land ownership, local (regional) economic policy, and the general attitude of entrepreneurs to the population and politicians.

According to Ježek et al. (2002), localization factors must meet two conditions; that the localization factor must be reflected in the costs or revenues of the enterprise and must be spatially differentiated (not available at all sites).

Three localization factors are listed by A. Weber:

- transportation costs,
- labor costs,
- consumer agglomerations (Predöhl, 1928).

Furthermore, A. Weber divides the factors according to the sectors of the economy in which they operate on the general and special, depending on the factors of the socio-political system on the natural-technical and socio-cultural, and on the dispersion of economic activities on regional and agglomerative factors (Predöhl, 1928).

For example, Cifranič (2016), as the most important localization factor describes six main categories; labor, market, land, infrastructure, environment, and legal social and economic conditions. Ježek et al. (2002) consider the most important location factor as relating to the purchasing and the sales markets. The localization factors of the purchasing market include natural resources, labor, suppliers of goods and services, information and access to information. The factors of the sales market are market potential, information, contacts, and business

readiness in sales market factors. Policy decisions are also a major factor in locational decision-making (Edwards, 2007). They involve the location of public facilities, which in turn may make a particular location more or less attractive to enterprises. Wokoun et al. (2008) divides localization factors from several different points of view, for example:

- spatial range,
- an economic approach,
- material nature,
- dynamics approach,
- management and planning systems.

Salih KuŞluvan (1998) identified the following factors as determinants of the companies' location:

- technological,
- economic and geographical,
- political,
- social.

The first determinant refers to the physical laws of the location and the support of infrastructure, such as motorways, airports, railways, sewers, etc., which determine the function of a possible facility. Economic and geographical determinants include people living in a locality that is worrying about daily occupational and non-occupational activities, proportionate to the ability and willingness to pay the corresponding residential costs. Those who cannot afford the most advantageous locations must choose more remote housing. This phenomenon is explained by the Host of Theory (Salih KuŞluvan, 1998) model, where cities are already on a trade route on a historical basis. Currently, retail homes and warehouses are often located in the center of demand where customers have easier access to stores. Political factors include zoning, which constitutes institutional consent in the community required by country legislation. Fiscal and judicial requirements are standard. The social factors that determine a location are a dominance, inclination and separation, centralization and decentralization, and invasion and success. On the one hand, people are moving towards gathering into communities, but on the other hand, for some reasons, they separate themselves for certain other reasons,

which results in the reservation of a country available only to a selected group. Social values vary depending on values over time and in the context of cultures.

To evaluate the quality of the business environment in the Czech regions, Viturka (2003) divided localization factors into six basic groups, which are assigned specific factors and weightings by selected sectoral groups of economic activities:

- business factors,
- infrastructure factors,
- working factors,
- local factors,
- price factors,
- environmental factors of quality of life.

However, the division of localization factors into Soft ones and Hard ones can be considered as crucial. Hard determinants are also sometimes referred to as measurable and Soft as non-measurable or subjective. The division into economic activities is not entirely clear. In general, however, Hard localization factors are those that directly affect business activity and can be directly calculated (asset acquisition, workforce, etc.). Conversely, Soft localization factors have an indirect or very small impact on an enterprise and are not included in accounting documents (quality of life, education of the population, etc.) (Damborský, Wokoun, 2010). There are many authors who have modified this basic division in some way. For example, Rumpel et al. (2008), divided Soft localization factors into Soft Business Localization Factors, which have a direct impact on business activity, and Soft Individual Factors that express the subjective issues of management and employees themselves. Dvořáček and Slunčík (2012) also used this typology of the factors. In their paper they divided factors into Soft, Soft individual and Hard; where Soft localization factors have a direct impact on the activity of business entities, they are subjective and non-measurable; Soft individual localization factors are personal preferences of management and self-employed, which are reflected in their work motivation and efficiency; and Hard localization factors are measurable.

Localization factors for individual industries

So far, general location factors across all sectors have been mentioned. However, there are a number of studies focused on localization factors for individual sectors of industries. For example, Verhetsel et al. (2015) deal with the logistics sector. They found out that land rent is

the most important factor in the location choice of logistics companies. The second most important factor was access to a port, followed by access to a motorway, a location in a business park and an inland navigation terminal are equally important. Hesse (2004), Holguin-Veras et al. (2005), Nguyen and Sano (2010), Ozmen-Ertekin et al. (2007) have also dealt with logistic companies. They proved that next to accessibility, the cost of land is a major location factor. Hayashi et al. (1986) were engaged in industrial companies and concluded that the most important location factor in the industry is accessibility.

Significant localization factors for the Manufacturing and Distribution industry include a good transportation system (near major interstates), strong utility systems (electric, water, wastewater, gas and well-educated workforce) and strong specialized training programs (Cohen, 2000). Rumpel et al. (2008) states that enterprises of the tertiary and quarterly sectors of the economy are most conditioned by soft location factors.

An interesting approach to localization factors is the study of Ramasamy et al. (2012), which dealt with factors based on international corporate ownership, i.e. state-owned and private. The authors have found that while the locally government controlled firms are attracted to natural resource-rich countries, private firms are more likely to provide value-added services than to exploit the resource itself.

From the theoretical basis of localization factor mentioned above, we can derive the most frequently discussed localization factors:

- geographical conditions,
- economic conditions,
- politics conditions,
- market potential,
- spatial proximity to suppliers,
- spatial proximity to consumer,
- spatial proximity to information and contacts,
- transportation costs,
- labor costs,
- availability of infrastructures of various types (transport, technical, scientific, technological, etc.).

2.4.3 Development of Location theories

Localization theories have undertaken huge development due to various changes concerning the world economy, the environment, and also globalization (Fujita, 2010). Richard Cantillon, an Irish banker who lived in Paris, is considered a pioneer of special economics. The roots of spatial economics can be traced to the year 1755[1]. Cantillon examined the relationship between cities and the surrounding countryside (Brewer, 2003). The official origin of localization theories is dated to the beginning of the 19th century in Germany, when there was great development of industry and agriculture. The beginnings of these theories were focused on the geometry of the site in the two-dimensional landscape (Krugman, 1997). The founders of these theories include Johann-Heinrich von Thünen, William Alonso, Walter Christaller and Alfred Weber[2], whose models served as the basis for localization theories and were expanded to the needs of geographers, economists, and regional scientists.

The primary goal of the authors of the localization theories was to specify the factors influencing the costs of companies and to situate the company near their appropriate allocation so that its costs were as low as possible. Thus, the theory addresses the spatial arrangement of corporations, minimizing costs and then maximizing profit.

The first localization theories were focused on agricultural activities, followed by industry-focused theories. Other approaches are theories using a multi-criteria approach and modeling.

Agricultural localization theories

The main representative of localization theory 200 years ago was Johann-Heinrich von Thünen (1783-1850), who in his work "The Isolated State" (Der isolierte staat, 1826) addresses the relationship between the use of agricultural land and its distance from the local market. His model is based on the assumptions of perfect competition (The Editors of Encyclopaedia Britannica, 2014). Thünen's work, as a work of the founder of spatial economics, has not lost his importance up to today.

His model defines that market (city) availability can create a complete land use system, and optimal location of cities and farmland balances between transport and local costs. It considers transport costs and the urgency of the needs of each crop as essential factors. It is a simple model in which methodological procedures for deeper localization theories have been outlined.

[1] See in: Cantillon, R. (1755). Essai sur la Nature du Commerce en Général.

[2] See in: Thünen, J. H. von. (1826). Der isolierte Staat in Beziehung auf Landwirtschaft und Nationalokonomie, Alonso, W. (1964). Location and Land Use, Christaller, W. (1933). Theory of Central Places, Weber, A. (1929). Theory of the Location of Industries.

The model assumes an isolated economy where the single market (city) is surrounded by agricultural activities that are concentrated around the market in circles. Furthermore, it assumes that transport costs relate only to distance and volume of transport and that the neighboring farmers on the market will produce crops that have the highest market value that will give them maximum net profit. The transport costs will be the determining factor for the rent. If transport costs are low, rents will be high and vice versa. This situation tends to make the rent fall with the distance from the market or the rent reaches zero (Peet, 1969).

The Thünen model also addresses the location of intense versus extensive agriculture in relation to the same market. Intensive agriculture will show a steep slope and will be placed closer to the market than extensive agriculture. Different crops will have different rental levels. Production of perishable goods (vegetables and dairy products) will be placed in a circle closer to the market than the less perishable crops (Peet, 1969).

There is one thing that the Thünen model does not address. The model doesn't consider the central issue of spatial economics and merely assumes the existence of a central urban market (Krugman, 1997). However, Thünen gave a very important stimulus to the theory of land use, illustrating theoretical considerations based on his experience. It is a simple theory, which can limit its practical significance (Ježek et al., 2002). The principle of the model is illustrated in the figure below.

Figure 2 Von Thünen model of localization of agricultural assets

Source: Own processing according to Thünen (1826)

William Alonso, in his paper Location and Land Use: Toward a General Theory of Land Rent, (1964), built on the Thünen model where the changes within cities were explained. He attempted to apply the city center accessibility requirements for various types of land use (housing, commerce, and industry) (The Editors of Encyclopaedia Britannica, 2014).

According to Alonso's theory of urban structure, each type of land use has its own rent and rent curve. The curve determines the maximum amount of land rent at a particular location. Households, retailers, and industry compete for placement in line with the rental curve offer and its city access requirements. All households are trying to occupy as much land as possible with their accessibility requirements. The land is cheaper on the outskirts of town, so households with less center accessibility are located on the outskirts of the city. These are typically high-income households. Lower-income households require greater access to the city center, so they are also located and competing with commercial and industrial businesses. This situation tends to create a separate territorial system, as households do not want to pay commercial and industrial land prices for a central location (Alonso, 2017).

Alonso's work, based on Thünen's theory, contributed to the development of urban economics. The work attempts to make testimonies about the structure of cities in a deductive way (Ježek et al., 2002). There are many alternative models of urban structure and many critics against this theory, for example Maier a Čtyroký (2000), who criticize this model for its unreality. However, the model allows an easy explanation for the tendency of cities to create rings of economic activities on the periphery and reasons for economic growth approaching the center.

Another significant contribution to localization theory is Walter's Christaller formulation of the theory of central place theory, which offers a geometric explanation of how places are created in relation to each other and why sites function as settlements, villages or cities (Berry a Harris, 1970). Theoretical considerations of this model are based on a homogeneous plane and transport links in all directions; producers maximize profit and consumers maximize benefits. The homogeneity of the area also applies to the availability of production factors, the population, and the associated supply are evenly distributed on the plane (Ježek et al., 2002). Lösch (1940) came up with the tradition of central-place theory, which analyzed the location and roles of manufacturing, marketing, etc. centers serving a hypothetical evenly spread agricultural population. Lösch was against Christaller ideas with his geometric insight that market areas should be hexagonal.

Industrial localization theories

The development of industry brought with it the emergence of industrial localization theories. The first representatives of industrial localization theory are W. Roscher (1865), A. E. Schäffle (1873) and W. Launhardt (1882). However, A. Weber (1929) is one of the best-known economists in this area[3].

The first representative of industrial localization theory was W. Roscher, who investigated how the location of industry affected the development of urban areas. The result of his work is that an industry with a low degree of work resorts to consumption points. Conversely, the industry with a high degree of division of labor seeks to take advantage of production benefits. Roscher's theory was based on the work of economist A. E. Schaffle, who claims that the decision about the location of firms is associated with distance and transport costs. (Ponsard a Stevens, 1983).

In 1885, mathematician Carl Wilhelm Friedrich Launhardt proved the relationship between land use and land rents. He called the relationship "bid-rent functions". He also explored the concept of market area analysis and spatial demand curves (Edwards, 2007).

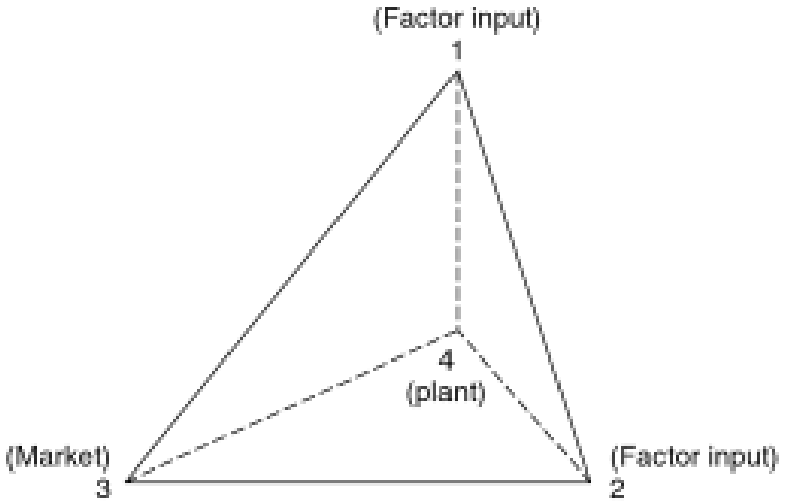
In 1909, the German economist Alfred Weber formulated an industrial site theory in his book The Theory of Industry (Über den Standort der Industrien, 1929), where he tried to minimize production costs associated with the transport of raw materials and products and to formulate an optimal corporate location. Weber was the first one who defined the notion of localization factor; the forces that influence management's decision-making about the location of a corporation in space (Predöhl, 1928).

Weber claimed that the localization of a firm serves one or more markets and relies on one or more sources of supply. The total number of such relevant points is not less than three (Krugman, 1997). This theory is called the Localization triangle (see in the Figure 3) and seeks an optimum position for the production of a fixed-market of goods and two raw materials that geographically form a triangle. He tried to identify the least costly location of production within the triangle by identifying the cost of transporting precious raw materials from both production sites and products from the production site to the market. Important factors in transport costs are the weight of raw materials and the final commodities. Commodities that lose weight during

[3] See in: Roscher, W. (1865). Studien über Naturgesetze, welche den zweckmässigen Standort der Industriezweige bestimen, Schäffle, A. E. (1873). Gesammelte Aufsätze. Die Handelskrisis von 1857, Launhardt, W. (1882). Der zweckmäsigste Standort einer gewerblichen Anlage, Weber, A. (1929). Theory of the Location of Industries.

production can be transported less costly from the production site to the market. For this reason, production plants should be located near raw materials. In cases where there is no large loss of weight in production, the total transport costs will be lower if they are close to the market. The lowest transport costs have been determined by this theory within the triangle. Weber also tried to determine an alternative location for cheap labor. Firstly, he brought in a change in transport costs against the lowest transport costs. Subsequently, he identified locations around the triangle that had lower labor costs than they did at the lowest transport cost. If the transport costs were lower than the labor costs, an alternative location was determined (Predöhl, 1928).

Figure 3 Weber's localization triangle



Source: Chan (2011)

Weber initially considered transport costs as the only factor that affects the location of an industrial unit. According to (Christofakis, 2014) other cost factors (labor and capital) face the same supply conditions in each area.

Modern localization theories

The development of localization theories has expanded since the second half of the 20th century with the use of multi-criteria approaches and modeling (Rumpel et al., 2008) due to large-scale globalization and the shift of the economy from the second sector to the third and fourth one[4]. The localization theories have been expanded in particular by the features of foreign activities such as the exchange rate, political risk, transnational policy and politics, and cultural differences (Popovici, Călin, 2014).

[4] Third sector includes, for example, trade, transport and communications, health, education, information, administrative and government services, financial, insurance, legal and other services. Fourth sector includes science, research, education and information technology.

Since the first approaches were proposed, many new ideas have emerged in regional and urban economics as the economy was not primarily based on industrial production, but services and education are at the forefront. The situation of technological, economic and political changes brought with the increasing importance of Soft localization factors at the expense of the Hard ones, which are explained above. Hard localization factors were becoming widely available and losing their importance, mainly because of the globalization of the world economy, increased competition and the development of transport technologies. These reasons mean that individual countries can offer Hard factors of the same quality as other developed countries. The third and fourth sectors are also not dependent on natural resources, which is also one of the reasons why localization theories lose their importance (Rumpel et al., 2008).

Many researchers developed quantitative techniques to identify a coherent local area because they had seen the importance of agglomeration economies and the distinction between central and peripheral areas. The field that they were investigated to introduce new challenges to the way of defining regions with an economic meaning is called the New Economic Geography. There are given different names to these areas, such as Functional Economic Area, Labor Market Area, etc., but they all mean a territory that internalizes the home-to-work daily journeys of their residents (Fernández Vázquez, Rubiera Morollón, 2012).

The modern localization theories were characterized by the characteristics of foreign activities, such as the exchange rate, political risk, regulations and policies at transnational level and cultural differences. The main processes that determine substantial changes in traditional factors were in the extension of the globalization process (Popovici, Călin, 2014). Recently, investors have been trying to find a suitable combination of both factors: localization factors and subjective factors (business, labor, regional, infrastructure factors, etc. (Krugman, Lawrence, 1993).

As already mentioned, investors' decisions must take into account the international economy because of the high impact of globalization. Therefore, modern localization theories must also be interested in this aspect. Krugman and Lawrence (1993) took this aspect into account in their work. They compared localization theories with trade theories that explain the behavior of international production and trade. Krugman concluded that the theories are very similar in the questions they focus on and in the assumptions they make. Optimal localization production should be concentrated in one country and the theories identify specific countries or regions in which product should be located. Trade theory not only addresses the characteristics of locality production but also the relative influence of production factors required to produce specific

goods or a conservative advantage in producing one product relative to another. Localization theory addresses the optimal location of production by the cost of production factors and transport costs to customers.

With the development of franchising, a localization theory focused on this type of business was created. The model is based on differences in location quality and shows how a franchiser chooses a location to open his company in a particular location while opening a franchise branch in another location. Chaudhuri and Ghosh (2001) in their model assume that there are differences in location quality (i. e., some locations are more lucrative than others because they offer greater potential to profit). The authors managed to prove that the franchiser would choose a better location to open their own company, but would open a branch in a less lucrative place. This model explains the coexistence of owned companies and franchise branches. Christofakis (2014) considers transport and infrastructure costs and costs related to transporting services to be the most important determinant in the choice of location of economic activities. Transport plays an important role in the economy and space for interconnecting systems in the market, the movement of raw materials, goods, labor and the population in general. However, until the 19th century, the location of production activities was dependent on the availability of raw materials, natural resources, and transport routes. The importance of these factors has been significantly reduced and new factors such as transport, telecommunications, and energy are emerging. Another factor that is responsible for the ongoing agglomeration of the population and industrial areas is defined by a development policy that takes responsibility for organizing infrastructure and relieves certain industries of certain costs. In recent years the technological development and the role of innovation and R&D have had an important impact. Technological developments also have an impact on the transportation sector, enabling new infrastructure opportunities, opportunities to reduce transport costs or increased speed to reliability.

Christakis's (2014) idea is based on the basic assumptions of localization theories in which a key variable is mostly transportation. However, he discovered shortcomings that limit the full set-up with factual aspects of the spatial behavior of the activities. His results show an increase in the impact of transportation costs and the importance of people moving, mainly due to the increase in urban commuting and the reduction of the transportation costs of products in recent years. These changes are mainly due to the large dispersion of economic activities with the trend of diversion from traditional urban centers, resulting in a distinction between residential and working areas. Combes et al. (2005) and Marcon and Puech (2003) came up with a new

approach in geographical statistics. They developed a new methodology for measuring spatial concentration or dispersion where they use location geo-data.

All location theories have been the subject of criticism over the years, given their assumptions that lead to generalizations, unreality, etc. However, the enforcement of these assumptions is disproportionate due to the variation of the environment and many other influences.

2.5 Investors' decision making

The decision-making of investors is largely influenced by the process of globalization, which affects not only the economic but also the political, cultural and social sphere. These spheres interact and influence the local decision-making of the subjects. Ritzer and Dean (2015) define globalization as a transparent set of processes involving increasing liquidity and increasing flows of people, objects, places, and information as well as the structures that are created. Compared to internationalization, which involves pursuing economic activities beyond national borders, globalization is a broader concept that includes the overall integration of these activities (Sýkora, 2000).

Due to the globalization process, market entry opportunities for investors have expanded. The most commonly used market entry options include export, licensing, alliances, franchising, and capital options such as acquisitions, mergers, and joint ventures. Capital inputs are considered to be the highest degree of company expansion and are more available to larger businesses.

There are many factors that influence decisions about expanding or initiating activities in a selected area. Investors, however, attribute different weight and motivation to these factors. Opinions on this issue also differ among the authors. For example, Dunning (2000) argues that an investor will be interested in entering a new country if capacity shift revenues outweigh the shift costs. Other arguments are the fixed cost of running the headquarters and the cost of setting up the operations. If the cost of running the headquarters is high and the cost of setting up the operations is low, investors will be interested in expanding their capabilities.

Blažek (2001) considers the low input prices at a branch location or the proximity of a high potential market in the selected market segment to be the main factor of foreign investment motivation. Damborský and Wokoun (2010) state that the entry into an economy is influenced by the fulfillment of goals set by the corporate strategy.

2.6 Company's performance assessment

Many methods are used to evaluate the performance of companies, for example, ratio indicators and differential indicators, systems of indicators – pyramid systems of indicators and targeted selection of indicators, and lastly, non-financial indicators (e.g. Balanced Score Card). However, there is a set of targeted selection indicators used to evaluate the performance of companies. The indisputable advantage of these models is their simplicity and ease of use.

Targeted selection indicators can predict the future of business behavior and are currently a very popular tool in many disciplines. In the field of economics, they play an important role in assessing the creditworthiness and financial health of a company. The models have been discussed in economics for many years since the first targeted indicators were published by Altman (1968) and Beaver (1966)[5]. In many countries, there were efforts to find the most effective empirical methods for predicting bankruptcy.

Four classical statistical methods are used to create targeted indicators, i.e. one-dimensional analysis, risk index model, multivariate discrimination analysis and conditional probability models. Each method has its own specific assumptions, advantages and disadvantages. However, most of the developed targeted indicators are based on the last two variants (Balcaen, Ooghe, 2006). Ooghe et al., (2005) claim that most targeted indicators use statistical techniques such as multiple discriminatory analysis and multiple logistic regression, but too often the problems associated with these methods are neglected. According to the authors, it can be generally stated that too complicated procedures reduce stability, transparency and there may be a problem with data application. Vochozka (2010) further argues that the classic targeted indicators do not include the time factor in business appraisal. The result of that model is, therefore, a fixed value that is independent of time. For this reason, classic failure assessment models can be considered inappropriate. However, these models summarize information about a particular company and evaluate its appearance whether the company is approaching a failing or prosperous society.

According to Holečková (2008), the targeted indicators can be divided into bankruptcy and creditworthiness. The bankruptcy models are based on current data and answer the question of whether a given company will go bankrupt in the near future. In contrast, creditworthy models

[5] See in: Altman, E. I. (1968). Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. The Journal of Finance, 1968, Vol. 23, No 4, s. 589 – 609, Beaver, W. (1967). Financial Ratios as predictors of failure. Empirical Research in Accounting Selected Studies, 1966 in Supplement to The Journal of Accounting Research, January 1967.

are based on theoretical knowledge that is complemented by empirical findings. Bankruptcy models aim to provide an early warning of likely bankruptcy. Creditworthy models provide an indication that a business owner can be satisfied with his performance because the business is able to generate value to the owner. The boundary between bankruptcy and creditworthy models is not precisely determined. Both models determine the numerical value by which they assess the company's financial health (Růčková, 2010). Ooghe et al. (2005) address the question of whether targeted indicators from different countries can simply be transformed to other countries. In general, it is not clear whether the error rate is dependent on the application of models in other countries. In their work, the authors further suggested several factors that may explain model performance. Possible factors that may affect model portability are model age, model origin, and company type. They also consider model features, technique, the complexity of variables and their number and definition of dependent variables as the main element influencing model portability. Also, Střeleček and Zdeněk (2012) tested different targeted indicators to demonstrate how they are able to assess the financial health of businesses. The conclusion of their research was that some models could not objectively assess the financial health of a business due to an inappropriate choice of indicators.

Due to the limited portability of targeted indicators, it is appropriate to monitor the data of Czech corporations on models that are developed for Czech conditions. Many authors have devoted themselves to the methods of enterprise evaluation in the Czech environment. The most famous of these are Grűnwald (2000), Synek, Kopkáně and Kubálková (2009), Sedláček (2007), Doucha (1995)[6] and the Neumeiers couple. In this work, the targeted indicators of the Neumaier couple will be introduced. These targeted indicators were created through discriminatory analysis and data are based solely on Czech companies. Therefore, they can only be applied to assessing the performance of a Czech company (Vochozka, 2010).

2.6.1 Neumeiers' indices

The Neumaiers' targeted indicators are presented in four variants, i.e. *IN95, IN99, IN01*, and *IN05*. The following indices can be divided according to their use into a creditor variant (*IN95*), a proprietary variant (*IN99*), a complex variant (*IN01*) and a modified complex variant (*IN05*) (Vochozka, 2010).

[6] See in: Grünwald, R. (2000). Finanční analýza pro oceňování podniku. V Praze: Vysoká škola ekonomická, Synek, M., Kopkáně, H., & Kubálková, M. (2009). Manažerské výpočty a ekonomická analýza, Sedláček, J. (2007). Finanční analýza podniku. Brno: Computer Press, Doucha, R. (1995). Bilanční analýza. Praha: Grada.

Neumaiers' indices belong among the most accurate indices for Czech companies. This is confirmed, for example, by Sušický (2011), who evaluated the usability of Czech and foreign bankruptcy models on the condition of Czech companies, even with regard to their sector. The Neumaiers' indices appeared in his work as one of the best rated. Sich (2015) had similar results which showed that the *IN05* model estimates reliable results for both small and medium-sized businesses. Neumaierová, I. and Neumaier, I. (2008) report the advantages and disadvantages of the *IN05* index which can be generally applied to other their indices. The advantages include the ease of calculation, the transparency of financial indicator algorithms, the use of publicly available information about business management, the possibility of using it also on companies trading on capital markets, providing clear results (except for the gray zone interval) and the suitability as a complement to the solution of the indicator system. On the other hand, the disadvantages of this indicator include the need to take into account that the model was built on medium and large enterprise data, based solely on annual business performance data and is merely an indicative characteristic where it is not possible to answer the question of how the enterprise has achieved their performance.

Index IN95

The *IN95* index is primarily focused on the company's ability to meet its obligations in a timely manner and is composed of indicators that are considered significant in the area of financial health assessment and are most commonly found in the resulting identifiers. Each indicator is assigned a weight that was determined as the ratio of the significance of the indicator given by the frequency of its occurrence in 1994. Each sector[7] has a different level of weighing of indicators that have been set at more than 1,000 Czech enterprises (Neumaier, Neumaierová, 1995).

It is an index that is able to use the outputs of Czech financial reporting and also includes the peculiarities of the Czech economic situation. The success rate of this index is greater than 70 % (Neumaierová, Neumaier, 2002).

The model *IN95* is described below (Neumaier, Neumaierová, 1995).

$$IN95 = V_1 * x_1 + V_2 * x_2 + V_3 * x_3 + V_4 * x_4 + V_5 * x_5 - V_6 * x_6 \quad (1)$$

x_1	total assets / foreign capital
x_2	EBIT / interest expense
x_3	EBIT / total assets

[7] Sectors are classified according to professional classification of economic activities (CZ-NACE)

x_4	total revenues / total assets
x_5	current assets / current liabilities
x_6	overdue liabilities / total revenues
V_{1-6}	sector scales

The *IN95* index determines a numerical characteristic that, if it is greater than 2, represents a company with good financial health, if the value is less than 1, the enterprise is financially unstable. In a situation where the index value is between 1 and 2, the company cannot be classified as healthy or vice versa (Neumaier, Neumaierová, 1995).

Index IN99

The modified *IN99* Index was compiled based on data from nearly 1,700 businesses in 1999, for which the economic profit was calculated, i.e. the company's ability to generate value for the owner of the company (Neumaierová, Neumaier, 2002)

The equation of the model IN99 is (Kubíčková, Kotěšovcová, 2006):

$$IN99 = -0{,}017 * x_1 + 4{,}573 * x_2 + 0{,}481 * x_3 + 0{,}015 * x_4 \quad (2)$$

x_1	foreign capital / total assets
x_2	EBIT / total assets
x_3	total revenues / total assets
x_4	current assets / current liabilities

The authors divided the companies according to whether they formed a positive or negative value of economic profit. Furthermore, a linear discriminatory analysis was conducted to identify the indicators that most explain the difference between the two groups of companies. The significance of these indicators is reflected in their weights. The success rate of this index is set at 85 % (Neumaierová, Neumaier, 2002).

If the company reaches values greater than 2.07, positive economic profit is generated. If the index is below 0.684, the company generates a negative economic profit. Enterprises with values between 0.684 and 2.07 are in the so-called gray zone, i.e. the result cannot be accurately determined (Kubíčková, Kotěšovcová, 2006).

Index IN01

The *IN01* Index, which was created in 2002 and tested on nearly 2,000 businesses, is trying to combine previous indices, i.e. *IN95* and *IN99*. The reliability of the index classification is reported by the authors for the value-producing companies at 67 % and for the businesses that go into bankruptcy at 86 % (Neumaierová, Neumaier, 2002).

The model *IN01* is computed as below (Kubíčková, Kotěšovcová, 2006):

$$IN01 = 0{,}13 * x_1 + 0{,}04 * x_2 + 3{,}92 * x_3 + 0{,}21 * x_4 + 0{,}09x_5 \quad (3)$$

x_1	total assets / foreign capital
x_2	EBIT / interest expense
x_3	EBIT / total assets
x_4	total revenues / total assets
x_5	current assets / current liabilities

An enterprise with an index value greater than 1.77 generates value for owners, a company with a value less than 0.75 goes into bankruptcy, and enterprises with a value between these values are part of the gray zone (Kubíčková, Kotěšovcová, 2006).

Index IN05

The latest index of Neumaier and Neumaierová (2005) is the *IN05* index, which is an actualized version of the *IN01* model with 2004 data. The success rate of the *IN05* index for prosperous businesses is around 80 % and for bankrupt companies 77 %.

The equation to compute the *IN05* is (Neumaier, Neumaierová, 2005):

$$IN05 = 0{,}13 * x_1 + 0{,}04 * x_2 + 3{,}97 * x_3 + 0{,}21 * x_4 + 0{,}09x_5 \quad (4)$$

x_1	total assets / foreign capital
x_2	EBIT / interest expense
x_3	EBIT / total assets
x_4	total revenues / total assets
x_5	current assets / current liabilities

In this model, the x_2 indicator is modified to a non-standard indicator that has a specified condition where the value of this indicator is limited to a maximum of 9. This is done to prevent the overweighting of the importance of other ratios. In this index, there is a minimal change in weights compared to the previous option, but there is a significant change in the classification rule of this index. If the index value is greater than 1.6, the enterprise creates value, and if the index is less than 0.9, the enterprise goes bankrupt. Between these values, businesses are again in the gray zone (Neumaier, Neumaierová, 2005).

This model was included in the methodology for the evaluation of a company's performance because it is the most up-to-date model and a model created for Czech companies. Furthermore, according to Kopta (2009), this model demonstrates high usability alongside the other three models (financial health index OP, Gurčík's index and Index IN99).

3. Methodological framework

Companies can be established in different locations. To find out the spatial phenomena of the companies, we have to introduce a statistical test that provides information about the behavior of the companies in space. The methodology was prepared for the headquarters of companies. However, this is not a requirement. If the location of the company was not considered to be its headquarter, but rather its real place of business, more accurate results would be achieved, especially in the Wholesale and retail trade, repair of motor vehicles sector and within large companies, where the results for the headquarters are limited.

In this section, we introduce Ripley's *K*-function and its derived Besag's *L*-function that is used for the determination of the distribution of the companies in our research. Then, we explain the inhomogeneous point process, especially the method of local scaling.

3.1 *K*-function analysis

It was considered that companies' positions form a point process. The most important activity in point processes is to summarize data sets by numerical and functional characteristics. The second-order characteristics offer a way to present statistical information about interactions among the points in different distances. Probably the most commonly used and the most popular functional second-order summary characteristics for the analysis of point patterns are Ripley's *K*-function *K*(r), Besag's *L*-function *L*(*r)* and the pair correlation function *g(r).* Illian et al. (2008) believe that these distance-based functions are more powerful than the other summary characteristics because of their way of statistical presentation of distributional information of point patterns. Further *L*-function provides the easiest interpretation because of its linear form.

Ripley's *K*-function was proposed by B. D. Ripley and describes the spatial dependence between events in point patterns (Ripley, 1976). This function calculates the expected number of additional events located in a ball surrounding a randomly chosen event and quantifies spatial dependence and clustering (e.g. Diggle (1983) and Ripley (1976)).

In the homogeneous case the K-function (Ripley, 1976) is defined as

$$K(r) = \lambda^{-1} E(number\ of\ points\ falling\ at\ a\ distance \leq r\ from\ an\ arbitrary\ point)$$

where *E(.)* indicates the expectation operator and λ (density) represents the mean number of events per area, and is considered to be constant. $\lambda K(r)$ can be interpreted as the expected

number of points within a distance r of an arbitrary point of the process. The empirical homogeneous K-function is defined as

$$\widehat{K}(r) = \frac{|W|}{n(n-1)} \sum_{i=1}^{n} \sum_{\substack{j=1 \\ j \neq i}}^{n} 1\{d_{ij} \leq r\} \, e_{ij}(r) \tag{5}$$

where $|W|$ is total study area, d_{ij} is Euclidean spatial distance between the i^{th} and j^{th} observed points, n is total number of points and e_{ij} is edge correction weight[8] used in estimating the K-function of a point pattern.

For complete spatial randomness (points are distributed completely randomly and independently in the area, abbreviated by CSR), K-function is equal to $K(r) = \pi r^2$, for $r > 0$. Significant deviations from this hypothesis represent alternative hypothesis, e.g. clustering for $K(r) > \pi r^2$, for $r > 0$ or inhibition for $K(r) < \pi r^2$, for $r > 0$ (Ripley, 1976).

To determine whether the distribution of companies is significantly different from CSR, L-function is commonly used. The L-function is a transformation of K-function proposed by Besag (1977), and presents the same information as K-function. On the other hand, L-function has graphical advantages. The L-function in the two-dimensional case is formulated:

$$L(r) = \sqrt{\frac{K(r)}{\pi}} \text{ for } r \geq 0 \tag{6}$$

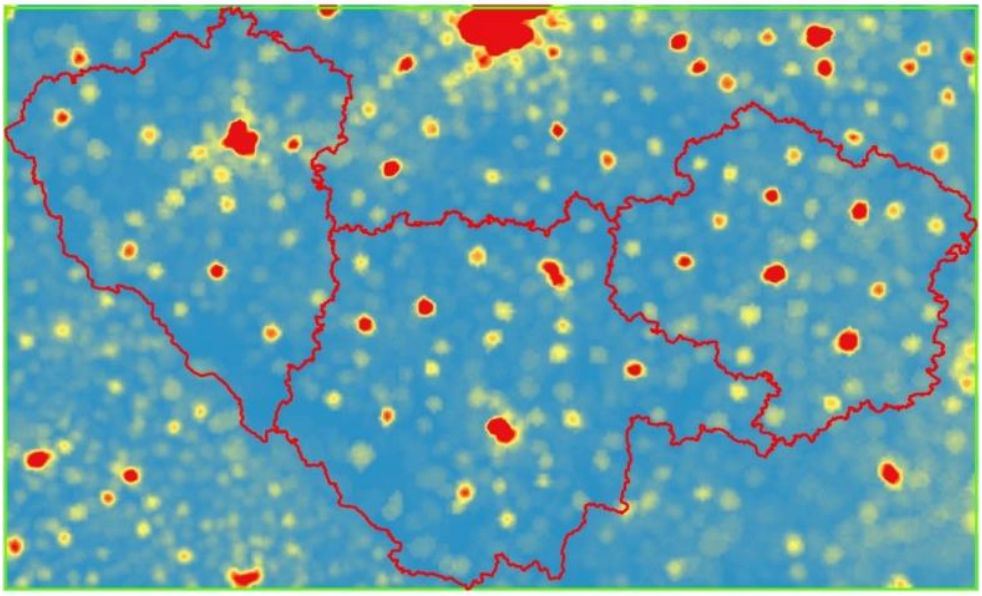
In the practical interpretation CSR leads to $L(r) = r$, $L(r) > r$ indicates clustering of point pattern while $L(r) < r$ indicates repulsion of point in the interpoint distance r (Illian et al., 2008).

3.2 Inhomogeneous spatial point patterns

We cannot consider that the density of companies is the same in the whole observation window. For this reason, it was necessary to use tools for inhomogeneous analysis. This approach is more realistic in large observation areas and areas with geographical features like mountains where the concentration of companies is not as common. In the proposed methodology we suppose that the location of companies is adapted to a variable point density, in our case population or size of the company in the given area. The Population density in the given area is depicted in **Chyba! Chybný odkaz na záložku.** where the observation area is highlighted with the red curve. The values with low population density are blue and with high population density are displayed in red.

[8] See, for example, Baddeley et al. (2016).

Figure 4 Population density



Source: Own processing

For inhomogeneous point processes, various models differing in the specification of how the interactions between points depend on the local density of points have been suggested. We will use local scaling for modeling the inhomogeneity (Hahn et al., 2003). This approach yields models for patterns that are homogeneous up to the local scale factor. The inhomogeneity is obtained by local scaling of the template process with a location-dependent scaling factor (in our study it is the population). If the scaling factor is constant, then the point process behaves like a template.

The main aim of local scaling is to find global summary characteristics which are adapted to variable point density by a mechanism of rescaling distances relative to local point density. This is achieved by replacing distance measures used in the density with locally scaled analogs defined by a location dependent scaling function (Hahn et al., 2003). Due to local scaling pattern, distances become shorter in the regions with low population density and longer in the regions with high population density.

The locally scaled version of *K*-function modifies distances (d_{ij}^{*}) for each pair of points x_i, x_j by rescaling factor $s(x_i, x_j)$. The rescaled distance for each pair of data points x_i, x_j is defined as

$$d_{ij}^{*} = \frac{\|x_i - x_j\|}{s(x_i, x_j)} \tag{7}$$

where the rescaling factor is computed as (Baddeley et al., 2016)

$$s(x_i, x_j) = \frac{1}{2}\left(\frac{1}{\sqrt{\hat{\lambda}(x_i)}} + \frac{1}{\sqrt{\hat{\lambda}(x_j)}}\right) \quad (8)$$

where $\hat{\lambda}$ denotes empirical density of points. When investigating location of companies, $\hat{\lambda}$ will be estimated using the population density function. If we are interested in location of companies with regard to their health (see below), the density of the point process is estimated non parametrically by kernel based estimation.

3.3 Locally scaled mark-weighted K-function

To find out if the health of companies is influenced by the surrounded companies the marks describing the health of companies must be added to the model. The second-order characteristic that provides exploratory analysis among marks in point pattern is mark-weighted *K*-function. The mark-weighted *K*-function has a very similar form as *K*-function but the marks are also taken into account. In a case of locally scaled mark-weighted *K*-function, it was necessary to modify the distances with local scaling.

Locally scaled counterpart of mark-weighted *K*-function can be estimated by:

$$\widehat{K_t}(r) = \frac{\sum_{x_i x_j \in W}^{\neq} t\left(m(x_i), m(x_j)\right) 1(d_{ij}^* \leq r) e_{ij}(r)}{\widehat{c_t}\,\widehat{\lambda}^2} \text{ for } r \geq 0 \quad (9)$$

where the d_{ij}^* are modified distances by local scaling, $m(x_i), m(x_j)$ are marks of the points of point process in observed window *W* describing health of companies, $\hat{\lambda}$ denotes non-constant intensity function, and $\widehat{c_t}$ is an estimator of mean test function *t* of marks that is given by:

$$\widehat{c_t} = \sum_{i=1}^{n} \sum_{j=1}^{n} t(m_i, m_j)/n^2 \quad (10)$$

The shape of the function *t* determines the tested relationship. E.g., the summary characteristic $\widehat{c_t}$ is based on the test function $t(m_i, m_j) = m_i m_j$ when we tried to identify if the health of the firm is influenced by the health of other companies surrounded by. In this way, the following phenomenon will be achieved; the higher the value of the function, the more the companies of the same financial health are attracted. The value of this function reaches its maximum at the moment when the health of companies is identical. When we wanted to find out if the companies are healthier when they are located in clusters or not, the test function $t(m_i, m_j) = m_i$ was used. If the value of the function reaches high values, it means that the company in the cluster is doing better and vice versa.

The most common way to find out differences of the empirical distribution of companies from a given null model is by using an exploratory tool called envelope tests that are often used in spatial statistic and were introduced by Besag (1977) and Ripley (1976). However, in our study, Global envelope tests are used as they are more exact and also offer a graphical interpretation (Myllymäki et al., 2017). These tests generate an acceptance band by computing function for *n* simulated patterns of the null model. The Global envelope tests reject the null hypothesis if the observed function is not completely inside the envelope. Their undeniable advantages are that they allow the selection of the significance level α and they yield *p*-values and provide graphical representation.

Global envelope tests offer more approaches. In this study, we recommend to use test where the critical bounds of the function are ordered according to the measure erl (extreme rank length), which is defined by Myllymäki et al. (2017).

4. Conclusion

This work deals with localization theories, what preceded their origin and what their initial ideas were based on. The thesis also introduces the basic methods of evaluating the performance of companies, namely the targeted selection of indicators of the Neumeiers' spouses, as these are subsequently used in the outlined methodology for evaluating the location of companies with regard to their health. The aim of the presented methodology is to answer whether it is better for the company to think of a location close to another company that is successful, or vice versa, a company that is not successful and is threatened by bankruptcy. Secondly, to introduce the methodology if the company is more successful if it is closer to another company or not.

Localization theories are focused on choosing a location for economic activities with regard to optimal resources. These theories are considered to be the starting point for the emergence of regional sciences, which are based on the discovery of specific characteristics that influence the location of activities. Choosing the right location is one of the most important decisions for a company.

The problem of localization has been solved deeply in history when the settlement of localities was dependent on available livelihoods and suitable climatic conditions. The first localization theories were focused on agriculture as they were created at a time when this sector was very widespread. Due to the development of industry, industrial localization theories have emerged, followed by modern localization theories. Localization theories have evolved greatly

since they were developed in connection with the development of the environment, conditions and, above all, the influence of globalization. Due to these constantly changing conditions, it is not possible to determine a universal localization factor that is linked to a specific market size or type. Companies influence both households (by providing work, selling services and goods) and the state (investment, taxes). Therefore, it is important for these entities to create an interesting environment for companies that would attract them and thereby contribute to economic development. Every start-up company that wants to expand and be successful must consider the localization of the factory.

The importance of targeted selection models has been steadily increasing in recent years. Many business owners are interested in being informed about the company's status or possible bankruptcy. Individual information from the financial statements of companies has only limited information about the state of the company, so it is necessary to further evaluate or process the information. For this reason, aggregate indicators are used, which have a higher predictive value and reflect the company's financial health.

Also, the targeted selection models have undergone long development since their creation, which is mainly due to the development of the environment in which the companies operate. With this flexible environment, indicators need to be continually adjusted for new conditions to increase their predictability. Neumeiers, who had compiled the first indicator in 1995, was also aware of this fact and updated it three times for new conditions in the Czech business environment.

However, it must be noted that location theories are of limited application importance since they predominantly assume perfect competition that cannot be achieved in the real world. Rather, they are theoretical models that can give us guidance on how to choose a destination, but we cannot define what can be expected.

5. Acknowledgments

Author states that the presented work was supported by the grant GA ČR 19-04412S of the Grant Agency of Czech Republic.

6. References

ALONSO, W. 2017. A Theory of the Urban Land Market. Readings in Urban Analysis. Retrieved from: doi:10.4324/9781315128061-1.

BADDELEY, A., RUBAK, E. and TURNER, R. 2016. Spatial Point Patterns : Methodology and Applications with R. ISBN 978-0-429-16170-4. Retrieved from: doi:10.1201/b19708.

BALCAEN, S. and OOGHE, H. 2006. 35 years of studies on business failure: an overview of the classical statistical methodologies and their related problems. Retrieved from: doi: 10.1016/j.bar.2005.09.001.

BAPTISTA, R. and SWANN, P. 1998. Do firms in clusters innovate more?. Research Policy. pp 525-540. ISSN 0048-7333. Retrieved from: doi:10.1016/S0048-7333(98)00065-1.

BEAUDRY, C. and BRESCHI, S. 2003. Are firms in clusters really more innovative? Economics of Innovation and New Technology. pp 325–342. ISSN 1043-8599. Retrieved from: doi:10.1080/10438590290020197.

BERRY, B. J. L. and HARRIS, CH. D. 1970. Walter Christaller: An Appreciation. Geographical Review. pp 116–119. ISSN 0016-7428.

BESAG, J. E. 1977. Comments on Ripley's paper. Journal of the Royal Statistical Society. pp 193–195. ISSN 1369-7412.

BLAŽEK, J. 2001. Velké firmy a subjekty progresivního terciéru jako aktéři regionálního rozvoje v České republice.

BLOREVOGEL, H. H. 2000. Zur Konjunktur der Regionsdiskurse. Informationen zur Raumentwicklung. ISSN 0303-2493.

BOADWAY, R., CUFF, K. and MARCEAU, N. 2004. Agglomeration Effects and the Competition for Firms. International Tax and Public Finance. pp 623–645. Retrieved from: doi: 10.1023/B:ITAX.0000036694.48277.c1.

BREWER, A. 2003. Richard Cantillon: pioneer of economic theory. ISBN 978-0-203-41731-7.

CICCONE, A. 2002. Agglomeration effects in Europe. European Economic Review pp 213–227. ISSN 0014-2921. Retrieved from: doi:10.1016/S0014-2921(00)00099-4.

CIFRANIČ, M. 2016. Localization factors in decision making of location of selected enterprises. Proceedings: Slovak University of Agriculture in Nitra. pp 305–314. ISBN 978-80-552-1503-7. Retrieved from: doi:10.15414/isd2016.s4.09.

COHEN, N. 2000. Business location decision-making and the cities: bringing companies back. The Brookings Institution Center on Urban and Metropolitan Policy.

COMBES, P. P., DURANTON, G. and OVERMAN, H. G. 2005. Agglomeration and the adjustment of the spatial economy. Papers in Regional Science. pp 311–349. ISSN 1435-5957. Retrieved from: doi:10.1111/j.1435-5957.2005.00038.x.

Czechinvest. (2005). Průvodce klastrem. [online]. 2005 [cit. 2018-11-05]. Retrieved from: http://old.czechinvest.org/data/files/pruvodce-klastrem-63.pdf.

DAMBORSKÝ, M. and WOKOUN R. 2010. Lokalizační faktory malého a středního podnikání v podmínkách ekonomiky ČR. ISSN 1212-3609.

DIGGLE, P. J., 1983. Statistical analysis of spatial point processes. Academic-Press, London.

DUNNING, J. H. 2000. The eclectic paradigm as an envelope for economic and business theories of MNE activity. pp 163-190. Retrieved from: doi:10.1016/S0969-5931(99)00035-9.

DUNNING, J. H. and BOYD, G. 2003. Alliance Capitalism and Corporate Management. Edward Elgar Publishing. ISBN: 978 1 84064 839 3.

DVOŘÁČEK, J. and SLUNČÍK, P. 2012. Podnik a jeho okolí: jak přežít v konkurenčním prostředí. V Praze: C.H. Beck. ISBN 978-80-7400-224-3.

EDWARDS, M. E. 2007. Regional and urban economics and economic development: theory and methods. Boca Raton, FL: Auerbach Publications. ISBN 978-0-8493-8317-5.

FERNÁNDEZ VÁZQUEZ, E. and RUBIERA MOROLLÓN, F. 2012. Defining the spatial scale in modern regional analysis: new challenges from data at local level. Heidelberg: Springer. Advances in spatial science. ISBN 978-3-642-31993-8.

FUJITA, M. 2010. The Evolution of Spatial Economics: From Thünen to the New Economic Geography. The Japanese Economic Review. pp 1–32. ISSN 1468-5876. Retrieved from: doi:10.1111/j.1468-5876.2009.00504.x.

FUJITA, M. a THISSE, J. 1996. Economics of Agglomeration. Journal of the Japanese and International Economies. pp 339–378. ISSN 0889-1583. Retrieved from: doi:10.1006/jjie.1996.0021.

HAHN, U., JENSEN, E. B. V., LIESHOUT, M. and NIELSEN, L. S. 2003. Inhomogeneous spatial point processes by location-dependent scaling. Advances in Applied Probability. pp 319–336. ISSN 0001-8678. Retrieved from: doi:10.1239/aap/1051201648.

HAYASHI, Y, ISOBE, T. and TOMITA, Y. 1986. Modelling the long-term effects of transport and land use policies on industrial locational behaviour: A discrete choice model system - ScienceDirect. Regional Science and Urban Economics. pp 123–143. Retrieved from: doi: 10.1016/0166-0462(86)90016-5.

HENDERSON, J. V. 2003. Marshall's scale economies. Journal of Urban Economics. pp 1–28. Retrieved from: 10.1016/S0094-1190(02)00505-3.

HESSE, M. 2004. Land for Logistics: Locational Dynamics, Real Estate Markets and Political Regulation of Regional Distribution Complexes. Tijdschrift voor economische en sociale geografie. pp 162–173. ISSN 1467-9663. Retrieved from: doi:10.1111/j.0040-747X.2004.t01-1-00298.x.

HOLEČKOVÁ, J. 2008. Finanční analýza firmy. Praha: ASPI. ISBN 978-80-7357-392-8.

HOLGUIN-VERAS, J., XU, N., LEVINSON, H. S., PAASWELL, R. E., MCKNIGHT, C. E., WEINER, R. D., OZBAY K. and OZMEN-ERTEKIN, D. 2005. An Investigation on the Aggregate Behavior of Firm Relocations to New Jersey (1990–1999) and the Underlying Market Elasticities. Networks and Spatial Economics. pp 293–331. ISSN 1572-9427. Retrieved from: doi:10.1007/s11067-005-3037-z.

CHAN, Y. 2011. A Software Survey of Analytics and Spatial Information Technology. Heidelberg: Springer Berlin Heidelberg, pp 411–440. ISBN 978-3-642-15663-2. Retrieved from: doi:10.1007/978-3-642-15663-2_8.

CHAUDHURI, A. and GHOSH, P. 2001. A Location Based Theory of Franchising. Washington State University. pp. 24.

CHRISTOFAKIS, M. 2014. Transport Cost in Location Practice and Economic Geography: Traditional theories, some new dimensions and policy implications. pp 55-67. Retrieved from: doi:10.2478/bog-2014-0029.

ILLIAN, J., PENTTINEN, A., STOYAN, H. and STOYAN, D. 2008. Statistical Analysis and Modelling of Spatial Point Patterns. B.m.: John Wiley & Sons. ISBN 978-0-470-72515-3. doi: 10.1002/9780470725160.

JENNEN, M. and VERWIJMEREN, P. 2010. Agglomeration Effects and Financial Performance. Urban Studies. pp 2683–2703. ISSN 0042-0980. Retrieved from: doi:10.1177/0042098010363495.

JEŽEK J. et al. 2002. Regionální rozvoj. ISBN 978-80-261-0462-9.

KOPTA, D. 2009. Possibilities of financial health indicators used for prediction of future development of agricultural enterprises. Agricultural Economics. pp 111–125. ISSN 0139570X, 18059295. Retrieved from: doi:10.17221/589-AGRICECON.

KRUGMAN, P. R. and LAWRENCE, R. 1993. Trade, Jobs, and Wages. Working Paper. National Bureau of Economic Research. Retrieved from: doi:10.3386/w4478.

KRUGMAN, P. R., 1997. Development, Geography, and Economic Theory. MIT Press. ISBN 978-0-262-61135-0.

KUBÍČKOVÁ, D. and KOTĚŠOVCOVÁ, J. 2006. Finanční analýza. Praha: Vysoká škola finanční a správní. ISBN 978-80-86754-57-4.

KUŞLUVAN, S. 1998. A Review of Theories of Multinational Enterprises. doi: 10.1142/9789813238459_0002.

Law No. 248/2000 Coll., Regional Development Support. (Zákon o podpoře regionálního rozvoje).

LAZERSON, M. H. and LORENZONI, G. 1999. The firms that feed industrial districts: A return to the Italian source. Industrial and Corporate Change. pp 235–266. ISSN 0960-6491. Retrieved from: doi:10.1093/icc/8.2.235.

LEE, Ch. 2009. Do firms in clusters invest in R&D more intensively? Theory and evidence from multi-country data. Research Policy. pp1159–1171. ISSN 0048-7333. Retrieved from: doi:10.1016/j.respol.2009.04.004.

LÖSCH, A. 1940. Economics of location. Yale University Press.

MAIER, K. and ČTYROKÝ, J. 2000. Ekonomika územního rozvoje. Praha: Grada Publishing. ISBN 80-7169-644-7.

MARCON, E. and PUECH, F. 2003. Evaluating the geographic concentration of industries using distance-based methods. Journal of Economic Geography. Oxford Academic. pp 409–428. Retrieved from: doi:10.1093/jeg/lbg016.

MARSHALL, A. 2009. Principles of Economics: Unabridged Eighth Edition. ISBN 978-1-60520-802-2.

MATOUŠKOVÁ, Z. 2000. Regionální a municipální ekonomika. Praha: Vysoká škola ekonomická, Národohospodářská fakulta. ISBN 978-80-245-0061-4.

MCCANN, B. T. and FOLTA, T. B. 2011. Performance differentials within geographic clusters. Journal of Business Venturing. pp 104–123. ISSN 0883-9026. Retrieved from: doi:10.1016/j.jbusvent.2009.04.004.

MINISTERSTVO PRO MÍSTNÍ ROZVOJ ČESKÉ REPUBLIKY, 2016. NUTS. Portál územního plánování [online]. Retrieved from: https://portal.uur.cz/spravni-usporadani-cr-organy-uzemniho-planovani/nuts.asp.

MOOMAW, R. L., 1981. Productivity and City Size: A Critique of the Evidence. The Quarterly Journal of Economics. pp 675–688. ISSN 0033-5533. Retrieved from: doi:10.2307/1880747.

MYLLYMÄKI, M., MRKVIČKA, T., GRABARNIK, P., SEIJO, H. and HAHN, U. 2017. Global envelope tests for spatial processes. Journal of the Royal Statistical Society: Series B (Statistical Methodology). pp. 381–404. ISSN 1467-9868. Retrieved from: doi:10.1111/rssb.12172.

NEUMAIER, I. and NEUMAIEROVÁ, I. 1995. Index IN – Index důvěryhodnosti českého podniku. Terno.

NEUMAIER, I. and NEUMAIEROVÁ, I. 2005. Index IN05. Evropské finanční systémy. Sborník příspěvků z mezinárodní vědecké konference. pp 143–148.

NEUMAIEROVÁ, I. and NEUMAIER, I. 2008. Proč se ujal index IN a nikoli pyramidový systém ukazatelů INFA. Ekonomika a management.

NEUMAIEROVÁ, I. and NEUMAIER I. 2002. Výkonnost a tržní hodnota firmy. Praha: Grada. ISBN 978-80-247-0125-7.

NGUYEN, Y. C. and SANO, K. 2010. Location Choice Model for Logistic Firms with Consideration of Spatial Effects. Journal of the Transportation Research Board. pp 17–23. ISSN 0361-1981, 2169-4052. Retrieved from: doi:10.3141/2168-03.

NORTH, D. C. 1955. Location Theory and Regional Economic Growth. Journal of Political Economy . pp 243–258. ISSN 0022-3808. Retrieved from: doi:10.1086/257668.

OOGHE, H., SPAENJERS, C. and VANDERMOERE, P. 2005. Business failure prediction: simple-intuitive models versus statistical models. Working Papers of Faculty of Economics and Business Administration, Ghent University, Belgium.

OZMEN-ERTEKIN D., OZBAY, K. and HOLGUIN-VERAS, J. 2007. Role of Transportation Accessibility in Attracting New Businesses to New Jersey. Journal of Urban Planning and Development. pp 138–149. Retrieved from: doi:10.1061/(ASCE)0733-9488(2007)133:2(138).

PEET, J. R. 1969. The Spatial Expansion of Commercial Agriculture in the Nineteenth Century: A Von Thunen Interpretation. Economic Geography. pp 283–301. ISSN 0013-0095. Retrieved from: doi:10.2307/142666.

PONSARD, C. and STEVENS, B. H. 1983. History of spatial economic theory. Springer. ISBN 978-3-540-12802-1.

POPOVICI, O. C. and CĂLIN, A. C. 2014. FDI theories. A location-based approach. Romanian Economic Journal. pp 3–24. ISSN 2286-2056.

PORTER, M. E. 1990. The competitive advantage of nations. New York: Free Press. ISBN 978-0-02-925361-8.

PORTER, M. E. 1998a. The Adam Smith Address: Location, Clusters, and the „New" Microeconomics of Competition. National Association for Business Economics.

PORTER, M. E. 1998b. The microeconomic foundations of economic development. The global competitiveness report. Switzerland: World Economic Forum. pp 38-63.

PORTER, M. E. 2000. Location, competition, and economic development: Local clusters in a global economy. Economic Development Quarterly. Retrieved from: doi:10.1177/089124240001400105.

POSPÍŠILOVÁ, T. and VAJDOVÁ, Z. 2007. Social network analysis report. Výzkumná zpráva z projektu The Challenge of Socio-economic Cohesion in the Enlarged European Union, Sociologický ústav ČSAV.

PREDÖHL, A. 1928. The Theory of Location in Its Relation to General Economics. Journal of Political Economy, pp 371–390. ISSN 0022-3808. Retrieved from: doi:10.1086/253950.

RAMASAMY, B., YEUNG, M. and LAFORET, S. 2012. China's outward foreign direct investment: Location choice and firm ownership. Journal of World Business, pp 17–25. ISSN 1090-9516. Retrieved from: doi:10.1016/j.jwb.2010.10.016.

RIPLEY, B. D, 1976. The second-order analysis of stationary point processes. Journal of Applied Probability. pp 255–266. Retrieved from: 10.2307/3212829.

RITZER, G. and DEAN, P. 2015. Globalization: A Basic Text. ISBN: 978-1-118-68712-3.

ROSENTHAL, S. S. and STRANGE, W. C. 2001. The Determinants of Agglomeration. Journal of Urban Economics. pp 191–229. ISSN 0094-1190. Retrieved from: doi:10.1006/juec.2001.2230.

ROSENTHAL, S. S. and STRANGE, W. C. 2003. Geography, Industrial Organization, and Agglomeration. The Review of Economics and Statistics. pp 377–393. ISSN 0034-6535. Retrieved from: doi:10.1162/003465303765299882.

RUBIERA MOROLLÓN, F. and VIÑUELA, A. 2012. From Local Units to Economic Regions in Spain. pp 23-44. Retrieved from: doi: 10.1007/978-3-642-31994-5_2.

RŮČKOVÁ, P. 2010. Finanční analýza: metody, ukazatele, využití v praxi. Praha: Grada. ISBN 978-80-247-3308-1.

RUMPEL, P., SLACH, O. and KOUTSKÝ, J. 2008. Měkké faktory regionálního rozvoje. V Ostravě: Ostravská univerzita. ISBN 978-80-7368-435-8.

SIEBERT, H. 1969. Regional economic growth: theory and policy.

SICH, O. 2015. Bonitní a bankrotní modely v praxi. Vysoká škola ekonomická v Praze.

SKOKAN, K. 2004. Konkurenceschopnost, inovace a klastry v regionálním rozvoji. Ostrava: Repronis. ISBN 978-80-7329-059-7.

STACHOVÁ, J., BLAŽEK J. and KOSTELECKÝ, T. 2007. Role of National and Regional institutions and Socio-economic Actors in Regional Development. In: SOCCOH Conference.

STEJSKAL, J. and KOVÁRNÍK, J. 2009. Regionální politika a její nástroje. Praha: Portál. ISBN 978-80-7367-588-2.

STŘELEČEK, F. and ZDENĚK, R. 2012. Importance of objective and formal adequacy for the indicators of enterprise financial health. Agricultural Economics. pp 543–551. ISSN 0139570X, 18059295. Retrieved from: doi:10.17221/5246-AGRICECON.

SUŠICKÝ, J. 2011. Využitelnost bankrotních modelů a jejich aplikace v podmínkách České republiky. Česká zemědělská univerzita v Praze.

SWANN, G. P. 1998. Towards a Model of Clustering in High-Technology Industries. The dynamics of industrial clustering. Oxford University Press. pp 52–76.

SÝKORA, L. 2000. Globalizace a její společenské a geografické důsledky.

THE EDITORS OF ENCYCLOPAEDIA BRITANNICA. 2014. Location theory | economics and geography. Encyclopedia Britannica [online] [vid. 16. září 2018]. Retrieved from: https://www.britannica.com/topic/location-theory.

THÜNEN, J. H. 1826. Der isolierte Staat in Beziehung auf Landwirtschaft und Nationalokonomie.

VANHOVE, N. 2018. Regional Policy: A European Approach. ISBN 978-0-429-82616-0. Retrieved from: doi:10.4324/9780429447921.

VERHETSEL, A., KESSELS, R., GOOS, P., ZIJLSTRA, T., BLOMME, N. and CANT, J. 2015. Location of logistics companies: a stated preference study to disentangle the impact of accessibility. Journal of Transport Geography. pp 110–121. Retrieved from: doi: 10.1016/j.jtrangeo.2014.12.002.

VITURKA, M. 2003. Regionální vyhodnocení kvality podnikatelského prostředí v České republice: výzkumný záměr 145600001 Faktory efektivnosti rozvoje regionů ČR. Brno: Masarykova univerzita. ISBN 978-80-210-3304-7.

VOCHOZKA, M. 2010. Vývoj metod komplexního hodnocení výkonnosti podniku. Politická ekonomie. pp 675–688.

WOKOUN, R. 2003. Česká regionální politika v období vstupu do Evropské unie. Oeconomica. ISBN 978-80-245-0517-6.

WOKOUN, R., MALINOVSKÝ, J., DAMBORSKÝ, M. and BLAŽEK, J. 2008. Regionální rozvoj: (východiska regionálního rozvoje, regionální politika, teorie, strategie a programování). Praha: Linde. ISBN 978-80-7201-699-0.