

PLACEMENT PROSPECTS OF THE BUSINESS IN TERMS OF PANDEMIC THREATS

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Purpose: The COVID-19 pandemic demonstrated that global production chains significantly reduce the security of states and companies: in the face of problems with the movement of goods and people, there have been disruptions in the supply of goods. States and companies should influence the location of safety-critical businesses by limiting their acceptable space. This means the need to form a list of businesses that are important to the security of the state or company and are sensitive to pandemic threats, as well as the need to establish acceptable placement for such businesses. To assess the prospects of business placement in terms of pandemic threats, it is necessary to improve theoretical approaches to the study of factors of business placement. On this basis, it is possible to conduct a qualitative study of pandemic threats as factors in the placement of businesses and to develop recommendations for states and companies to limit the space for the acceptable placement of relevant businesses.

Design/methodology/approach: Morphological analysis is used as the main research method.

Findings: It is advisable to divide the business placement factors into internal factors, which are generated by the "business" side and external generated by the "place" side, as well as for the past, present and future. Internal and external factors of business placement form complementary pairs of factors, which are characterized by the strength of the impact, as well as the possibility of artificial creation, cost and duration.

Originality/value: Business placement factors need to be investigated over time, for which it is advisable to use the term PPF-research (past-present-future-research). Pandemic threats were in the past, are now and, with a high probability, will be factors in the placement of many types of business in the future. Business placement under the influence of pandemic threat factors in targeting sales markets sharply increases the attractiveness of production using 3D printing technologies, the widespread and continuous improvement of which should become one of the priorities of the innovation policy of states and companies in Europe.

Keywords: business placement, pandemic, placement factors, safety, 3D printing.

Category of the paper: Research paper.

1. Introduction

The COVID-19 pandemic has demonstrated that global production chains significantly reduce the security of states and firms: in conditions of problems with the movement of benefits and people, there have been significant interruptions in the supply of important benefits (Nicola, 2020). At the beginning of the coronavirus epidemic, hospitals in European countries lacked masks, ventilators and disinfectant gel. Pharmaceutical wholesalers, like pharmacies, have continually worked to ensure widespread access to medicines, but this has not always been successful. Many of the active ingredients used in pharmaceutical factories in Europe are manufactured in China. For example, in France, paracetamol is no longer produced, and 97% of antibiotics for the US market are imported from China. There are many examples of the dependence of the markets of many countries on imports from distant countries, and this dependence is often characteristic of strategic benefits. The threat of disruptions in the functioning of global value chains was recognized earlier, but there was no impetus for decisive changes.

The epidemic may prompt multinational corporations not to concentrate too much production in one country or region. Moreover, the likelihood of future epidemics of communicable diseases may prompt countries to pursue policies of producing strategic benefits within their own borders. This idea, in general, is not new, since, for example, the concept of Autonomous Energy Regions has long existed, according to which certain regions of the state, for the purpose of energy security, should be self-sufficient in energy production. It is expected that along with ensuring energy security, this concept, which involves the active use of renewable energy sources, will stimulate ecologically safe local socio-economic development in energy, agriculture, transport, and construction.

From the point of view of taking into account pandemic threats, states and firms should influence the placement of business that are important to security, limiting the space for them to accept. This means the need to form a list of businesses that are important to the security of the state or company and are sensitive to pandemic threats, as well as the need to establish acceptable consumer accommodation spaces for such businesses.

Dividing benefits into categories, it will be necessary to remember not only about finite benefits, but also not completely (resources), which are necessary for the production of final benefits, and their category in terms of the boundaries of the placement space should be associated with the category of the corresponding final benefits. It is quite possible to produce strategic benefits and resources for their production within the respective clusters.

To assess the prospects for placing a business in conditions of pandemic threats, it is necessary to improve theoretical approaches to the study of factors of business placement. On this basis, it is possible to conduct a qualitative study of pandemic threats as factors in the placement of business and to develop recommendations for states and firms to limit the space for the permissible placement of relevant businesses.

2. Pandemic threats as a factor in business placement

In the process of scientific research of the existing or justification (forecasting) of the future placement of a business, it is indisputable that it is expedient to identify the factors of placement, that is, the reasons that need to be taken into account when justifying (predicting) future placement (answering the question “where?”) or explaining the previous or existing placement (answering the question “why here?”) business. The study of business placement factors was carried out from the beginning of the emergence of economics (Allen, 2014; Beckmann, 1968; Blaug, 1979, 2006; Brown, 1979; Fujita, 2004, 1999; Hirsch, 1967; Hoover, 1948; Isard, 1956; Krugman, 1995, 2010; Lejpras, 2012; Lloyd, 1977; Losch, 1954; Marshall, 1890; Moses, 1958; Perroux, 1950; Sheppard, 2017; Torre, 2005, 2000; Venables, 1996; Weber, 1929), however, along with the division of placement factors into internal (properties of the “business” side) and external (properties of the “place”), as well as for the past, present and future, it is advisable to consider them simultaneously in the space-time dimension (Table 1).

Table 1.
Dimensions of business placement factors

Spatial dimension of business placement factors	Time dimension of business placement factors		
	past	present	future
internal	inpa	inpr	infu
external	expa	expr	exfu

Source: own development.

The study of the former factors of business placement is important not only from a historical point of view (what were these factors and how correctly they were identified), but also from the point of view of the present and the future, since for this one can use the corresponding dependencies and trends from the past.

It is advisable to start the study of business placement factors with an analysis of the properties of the technology that is planned to be used for the production of benefits. Technology can be defined as a spatio-temporal system of a combination of resources for the production of benefits. It is the resources and their consumption rates that identify the technology, allocate it. It should be emphasized that in addition to the desired benefits, the result of the functioning of the technology is also the so-called undesirable benefits (waste), the use of which is technically impossible or economically inexpedient under existing conditions. Each technology will be characterized by the point in time and in what volumes during its operation which pollution will be formed. Obviously, information on pollution from the application of technology could be considered in terms of production costs by taking into account the costs of compliance with environmental regulations. However, the places may differ in the mechanism of environmental regulation, predetermine the need for the calculation of the corresponding costs tied to a specific place. Therefore, the component of production costs, which would take into account the costs of compliance with environmental standards in the relevant place, is advisable to consider separately.

Thus, the properties of the technology, which are at what time and in what volumes during the implementation of the corresponding technological process the resource should be used, as well as in what time and in what volumes which pollution will be formed, can be factors that should be taken into account when the choice of the place of production of the benefit. Compiling an ordered list of characteristics (properties) of technologies we will have: the moment of the emergence of the need for resources or the formation of pollution; the resource is required at the specified time; how much of the specified resource is required; which pollution is formed at a specified time; the amount of pollution generated.

This implies the need for information on the characteristics (properties) of the resources that are used in the course of the corresponding technological process, and the characteristics (properties) of the contaminants formed when applying the corresponding technology. Thus, after analyzing the characteristics (properties) of a technology, there is a need to analyze the characteristics (properties) of the resources and pollution corresponding to it.

A resource is everything that can be used in the technological process for the production of benefits. Obviously, the characteristics (properties) of resources are extremely diverse and each of them can be assessed from the point of view of the impact on placement. These properties, in particular, are: mobility; the physical state; safety (during storage, transportation, use) specific gravity and the like. It should be emphasized that labor resources (including the person who chooses the place for the business) with their specific properties also belong to resources. Resource properties can be factors in business placement.

The characteristics (properties) of the pollution are different, including: physical state; level of aggressiveness; toxicity level; duration of "life"; propagation distance, etc. The properties of the pollution can be factors in business placement.

Benefit is the result of the functioning of technology. The characteristics (properties) of benefits are extremely diverse, in particular: mobility or immobility; the physical state; safety (during storage, transportation, use) specific gravity; malleability and the like. The properties of benefits can also be factors in the placement of the respective business.

The properties of technologies, corresponding resources, pollution and benefits form the properties of the "business" side. The properties of the "business" side determine the appropriateness of its orientation when placing in places that have the qualities of conformity to the specified properties. There is a relationship between the properties of a business and the properties of places, since some property of a place corresponds to each property of a business.

Let's focus on the properties of places. A place is a part of a space, somewhere or someone can be accommodated. Characteristics (properties) of places is extremely diverse, in particular: location relative to sales markets; availability; environmental quality; availability of resources; resource prices; bearing capacity of soils; geometric parameters; legal; neighborhood; compliance with the destructive influences of nature and the like. It is obvious that the properties of the place can be factors of the placement of the business.

Establishing a correspondence between the properties of the parties “business” and “placement” and the factors of placement, it should be emphasized that only some of the properties are factors of the placement of the business. That is, there are properties of the “business” side, some of which may be factors of placement. It depends on them what places it is advisable to look for for a business. Each property of the “business” side will correspond to a certain property of the “placement” side, which should also be considered a placement factor. Thus, in each case, answering the question “where?” or to the question “why here?”, it is necessary to show not individual factors of placement, but their pairs: the factor of placement is internal – factor of placement is external.

It is obvious that each specific case of business will be characterized by a number of properties of the “business” side and the corresponding properties of the “place” side. Then it remains to find places with such a set, which will be considered places of possible business placement.

Both external and internal factors of business placement can be characterized by the force of action, as well as the possibility of artificial creation, cost and duration of this. The strength of the factors of business placement, obviously, is different for different combinations of the “business” side – the “place” side, and is determined by their influence on the indicator, which is taken as a criterion for choosing a placement. Here it is worth talking about three levels of impact – decisive (as is the case, for example, immobile resources or immobile benefits), important (25-75% influence on the criterion for choosing a place), usual (up to 25% influence).

Business placement factors need to be investigated over time, for which it is advisable to use the term PPF-research (past-present-future-research). It is clear that the factors of business placement in the PPF study will always relate to the places and technologies of production of specific benefits. Therefore, we can talk about PPF-research of places, PPF-research of technologies and, if necessary, PPF-research of industries (in the sense of producers of identical benefits within a certain spatial unit, for example, region, country, etc.). Since the production of identical benefits can occur with the help of different technologies, the PPF-research of the industry will simultaneously be the PPF-research of technologies used in the industry to produce the corresponding benefit.

Pandemic threats have been, are and will be factors of business placement. At the same time, the internal factor is the value of the benefit, the production of which is planned to be located for the state and firms, and the external factor is the space that is permissible for placement in terms of pandemic threats: the EU, a separate state or smaller spatial units within a separate state. Having established the value (category) of the benefit, we, thereby, establish the space for the permissible placement of its production, and within this space, focusing on the factors of placement of production; we establish the possible places of production of the benefit.

3. Formation of business placement factors

As for the artificial formation of business placement factors, a whole field for scientific activity opens up here. Firstly, not all factors of business placement are subject to such creation. Secondly, it is obvious that great opportunities for the artificial creation of business placement factors are on the “place” side, although the “business” side may have the potential for this and the actual use of this potential may give good non-obvious prospects in managing the placement process. Third, the artificial creation of business placement factors will require financial and time costs, and automatically form the need to justify the economic feasibility of this.

It is obvious that the experience of state influence on the activation of the economic development of regions gives many examples of factors of business placement of an artificial nature. According to the criterion of the object of state influence, measures to artificially create factors for the placement of a business can be divided into four groups: measures that would reduce the cost of producing benefits when placing a business in the places desired by the state; measures that would reduce the cost of transporting benefits to sales markets when placing a business in the places desired by the state; measures that would make it possible to sell benefits produced in the places desired by the state at prices higher than market ones; measures to reduce taxation of business profits when it is located in the places desired by the state.

Measures that would reduce the cost of manufacturing products when placing a business in the places desired by the state may relate to one-time (investment) and current costs. Reducing investment costs is possible with the help of: infrastructure development of the territory at the expense of the state; partial compensation by the state of investment costs (including the cost of acquiring a land plot necessary for business); reduction of taxable profit of business entities making investments in places desired by the state. Reducing operating costs can be achieved by lowering the prices of resources needed to produce benefits, as well as by reducing the costs associated with the delivery of these resources. The state can achieve lower prices for resources by partially compensating current costs. Reducing the costs associated with the delivery of resources concerns, first of all, transport and storage costs, as well as customs duties and value added tax. The state can reduce the costs associated with the delivery of resources by adopting an appropriate administrative decision (this concerns, first of all, customs payments and value added tax, but partly transport and storage costs) and through partial compensation of transport and storage costs.

Like the current cost of producing benefits, the state can reduce the costs of transporting benefits to consumers. This can happen both by making an appropriate administrative decision to reduce the prices for the transportation of benefits produced in the respective regions, and by partially compensating the state for the cost of transporting benefits. Taking into account the ambiguity of the policy of state intervention in pricing, especially in the form of making administrative decisions, these measures can be recommended only in cases when they concern

natural monopoly enterprises. This is a fairly large sphere of the economy, in which both the production of many important resources and the provision of various transport services are carried out.

An extremely important state measure to increase the attractiveness of places for business is the creation of a resource “qualified personnel” (through targeted training of specialists or their involvement from other regions and countries). Describing a business in terms of placement, we can talk about “business cats” and “business dogs”. This name is a derivative of the long-established fact that “a cat gets used to a place, and a dog gets used to a person”. Accordingly, “business cats” are more focused on immobile factors of placement (availability of a resource source, infrastructure, climate), and “business dogs” are not closely tied to a place, and their placement is highly dependent on skilled workers, who are a fairly mobile resource. ... It is with the attraction of highly qualified personnel that the expectations of the accelerated development of regions, devoid of other factors of business placement, are often associated. Places with a high quality of life attract highly skilled workers and thus become attractive to “business dogs”.

As for the artificial creation of internal factors of business placement (technologies, resources, pollution, benefits), the possibilities are significantly less, but they also exist. The producer can go by changing the technology of production of benefits (for example, the production of cement by a dry, rather than wet, method, can neutralize the factor of cheap water resources during placement), replace certain resources (for example, use electricity instead of natural gas, which can neutralize the factor of cheap gas when placement), the use of environmentally friendly raw materials (for example, coal with a low sulfur content, can neutralize the factor of low costs of emissions prevention or the factor of low requirements for environmental impact), orientation to areas with a positive image for prospective consumers of benefits (for example, environmentally friendly regions for agricultural production, which can offset the factor of low production costs). Obviously, in order to make a decision on the feasibility of artificially creating an internal or external factor for placing a business, you will need to know the financial costs and duration, as well as the economic effect of this. At the same time, one should not expect to receive universal recommendations, since everything will depend on the specifics of the region and industry.

4. The need for government support for 3D printing

With the exacerbation of the requirements for the space for the permissible placement of strategic benefits in the context of pandemic threats, the state should support projects in various ways that facilitate the placement of production responses near sales markets. 3D printing technology is undoubtedly the most important of such projects, which necessitates the

introduction of a special program to support research in this area and stimulate the placement of production of benefits near sales markets. Organization of production of benefits using 3D printing technologies is associated with the need for such resources (Stadnicki, 2018):

1. printing devices – 3D printers,
2. electricity,
3. materials for 3D printing,
4. software,
5. work related to the maintenance of the 3D printing process,
6. technical infrastructure,
7. the space required to organize production.

The main factor in the spatial differentiation of production costs using 3D printing technology will be the spatial differentiation of the price of electricity and materials for 3D printing, since in different places the prices for 3D printers and software will be the same, and the cost of labor is associated with the direct maintenance of 3D printers. There will be little impact on total production costs. It follows from this that places (regions, countries) with a relatively low price of electricity and materials for 3D printing will be attractive for placing the production of benefits using 3D printing technology. However, it is worth noting that the advantage of low prices for electricity and materials for 3D printing can be offset by the difference between the cost of transporting benefits produced in a place with a lower price, and the cost of transporting resources to a place of production located near the sales market. Ready-made benefits, as a rule, are not adapted to the transport process; therefore, measures are applied to them aimed at increasing their transportability. For this reason, transporting resources for 3D printing will require fewer costs than transporting finished products. However, good transport infrastructure, lower logistics costs, can make places with relatively low prices for electricity and 3D printing materials more attractive for the production of benefits using 3D printing technology.

In a situation of relatively low spatial differentiation of production costs and taking into account the fact that materials for 3D printing will always be cheaper for transportation than finished products, the production of benefits using 3D printing in most cases will be advisable to be located near sales markets. However, in this case, it is necessary to assess the size of the sales market (in terms of area and demand for a specific product). There are many options, from the minimum size (production at the place of consumption, for example, in an apartment), to the maximum (production for the market of a territorial unit, such as a city). It can be assumed that it would be advisable to produce some benefits at the place of consumption (residence), but for economic reasons (small-scale production is not very effective) and because of safety conditions (noise, environmental pollution), in most cases production will take place in special premises and on a large scale. Then the factor of placement will be the corresponding amount of demand within the corresponding space.

The state, within the framework of supporting 3D printing technologies, should focus on supporting research on the development of these promising technologies (improving 3D typists, materials for 3D printing, software, technical infrastructure, improving the qualifications of technical personnel, improving the production space), as well as to reduce the cost of production as much as possible by eliminating import duties on 3D typists, materials for 3D printing, electricity, software. State support for the development of infrastructure for 3D printing, at least within the space of acceptable placement, will also be important.

The factor of the category of strategic benefits, that is, the factor of reliability of supply, can be taken into account in the matrix for the classification of benefits by factors of production placement (Stadnicki, 2020). It follows from this that the state only needs to correctly determine the category of the benefit from the point of view of the reliability of supply, and the space for the admissible placement of the search for optimal places for the production of this benefit will be determined automatically. Therefore, an important direction for further scientific research on the prospects for placing a business in the context of pandemic threats is to link the category of benefits from the point of view of security of supply with the space of an acceptable search for optimal places for producing benefits of the corresponding category.

5. Conclusions

The COVID-19 pandemic has demonstrated that global production chains significantly reduce the security of states and firms: in the face of problems with the movement of goods and people, there have been disruptions in the supply of important benefits.

From the point of view of taking into account pandemic threats, states and firms should influence the placement of business that is important to security, limiting the space for them to accept. This means the need to form a list of businesses that are important to the security of the state or company and are sensitive to pandemic threats, as well as the need to establish acceptable consumer accommodation spaces for such businesses.

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With the exacerbation of the requirements for the space for the permissible placement of strategic benefits in the context of pandemic threats, the state should in various ways support projects that facilitate the placement of production responses near sales markets. 3D printing technology is undoubtedly the most important of such projects, which necessitates the introduction of a special program to support research in this area and stimulate the placement of production of benefits near sales markets.

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