Modern Business Services as a Strategy for the Development of Smart Specializations

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Abstract:

Purpose: The aim of the article is to identify and define the significance of selected factors of the location of modern business services in Polish regions where smart specialization in the field of modern business services can be used as a development strategy.

Methodology: The empirical study was carried out following the goal set. During the research process, data collected from the Association of Business Service Leaders and the Statistics Poland were compiled. They concerned the sector and centers of modern business services operating in the years 2014-2020 on the Polish market. The research procedure was carried out with the use of principal components analysis, Hellwig's method, and cluster analysis. The Statistica program was used for the calculations.

Findings: The results of the conducted research suggest that the significant factors are infrastructural and qualitative ones. The main motive for creating centers is the expansion of existing entities that provide modern business services in Poland and the differences in the level of development of modern business services in the Polish cities selected for the analysis. The leaders of this development were indicated, i.e., Cracow, Warsaw, and Wroclaw, while the lowest level in the cities of Bydgoszcz, Rzeszow, and Lublin.

Practical implications: The research results provide managers of enterprises and regions with information that can be used in designing and implementing development strategies for the creation, location, and relocation of modern business service centers. They are also a source of knowledge necessary for making decisions of national importance, e.g., regarding infrastructure retrofitting for the development of modern business services, and for decision-makers in the European Union as regards where to direct financial support to improve the level of development of modern business services.

Originality/value: This article is a multifaceted approach to the analysis of the location of modern business service centers from the perspective of the regional smart specialization development strategy.

Keywords: Modern business services, smart specializations, business services sector, location factor, Hellwig's methods, Ward's methods, PCA.

JEL Classification: L21, L84, B16, R11, R58.

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1. Introduction

Contemporary socio-economic changes, related in particular to the ongoing process of globalization, competition, and the development of information technologies, have contributed to the shaping of the knowledge-based economy (KBE) model. The transformations taking place since the 1990s resulted in the creation of the so-called "New Economy", in the development of which a high degree of connections and interdependence between the economies of individual countries plays a key role. For this reason, the international exchange of services is a key component that intensifies their growth.

The process of creating KBE is based, inter alia, on the development of the sector of modern and specialized business services. The provision of services of this type is associated with the relocation of selected domains of activity to other countries. Metropolitan areas located there play the role of poles of economic growth and areas of shaping and expansion of new types of business activities. Thus, they specialize in providing knowledge-based services, trying to adapt their economic and spatial architecture to the principles of the global economy.

The dynamic development of the modern business services (MBS) sector was related to the accession to the European Union of selected countries of Central and Eastern Europe, in particular Poland, which is a leader in the outsourcing services sector. Nowadays, mainly US and Western European corporations invest in modern business centers located in this part of the world. Their activity is based primarily on outsourcing and offshoring of implemented processes. Such activities are carried out in modern business service centers.

The concept of smart specialization has dominated for several past years the considerations on regional development, the main goal of which is the optimal use of the endogenous development potential of countries and regions (Brańka, 2016, pp. 245-261). Regional specializations are to reflect the specificity, uniqueness, and economic originality of each region, which should lead to the creation of areas and niches enabling sustainable and dynamic development while strengthening interregional cooperation. The concept of smart specialization assumes that the region should concentrate its development efforts on a limited number of priorities with significant innovative potential. Modern business services may constitute such a development priority.

Modern business services and smart regional specializations are key categories for contemporary socio-economic development and are increasingly the subject of scientific considerations in various fields. Many authors explore this subject through the lens of available data or present the discussed issue in a relatively narrow range, but each category is presented separately. It is relatively rare that the available analyzes verify empirically the spatial aspects of the modern business services development level in the context of selected factors shaping them, with a particular focus on these services as smart specialization that could constitute a regional development strategy.

This is the reason why the authors undertook the study involving the assessment of the level of development of modern business services in the context of considering them as smart specialization, which may become the basis for achieving competitive advantage of the region and a means of generating innovative activities.

This article aims to contribute to the considerations of the aspect under study in three ways. First, it provides a theoretical framework for modern business services with localization factors that shape their occurrence and development, and for smart specializations around Regional Innovation Strategies. As a consequence, it points to the effectiveness of the regional development policy, the main goal of which is to use the endogenous development potential of countries and regions. Secondly, it empirically evaluates the framework of this policy in terms of factors shaping the development of modern business services in selected Polish cities, which may constitute a regional development strategy in the field of smart specialization. The assessment was based on the characteristics adopted for the research. Thirdly, it combines the measurement of the level of development of modern business services in selected cities/regions based on the indicated factors shaping them with smart specializations that may constitute a regional development strategy.

In line with the above assumptions, the article aims to try to identify and define the importance of selected factors of locating MBS centers in Polish regions where smart specialization in the field of modern business services can be used as a development strategy.

In connection with thus formulated topic of the study and thus defined research goal, it was decided to verify the following hypothesis: both traditional and modern location factors significantly affect the decision-making process regarding the location of MBS centers and the choice of smart specialization in terms of development strategy.

To verify the hypothesis, the following research tools were used, principal components analysis, Hellwig's development pattern method, and cluster analysis.

2. Theoretical Background

2.1 Development and Localization Factors of Modern Business Services on the Polish Market

The contemporary trend of internationalization of enterprises related to the transfer of basic production and service functions abroad is referred to as offshoring. In turn, outsourcing the implementation of non-strategic tasks to external organizations is called outsourcing. This process is accompanied by the creation of modern business service centers, which are usually located in countries with lower labor costs.

The typology of services takes into account their classic division into traditional and modern ones, but also the criterion of the dynamic growth of the share of services in the creation of the Gross Domestic Product (GDP) is distinguished. Based on the indicated concept, the following services can be distinguished: traditional, modern, and based on a hybrid combination of modern and traditional services (Eichengreen and Gupta, 2013, pp. 98-100). International companies are usually able to perform most of the functions individually. Nevertheless, it is associated with significant costs, therefore they decide to outsource tasks to external entities.

Modern business services (MBS), also referred to as outsourcing in the literature on the subject, refer to the strategic allocation of external resources to carry out operations that in typical circumstances would have been performed by in-house employees. This type of approach begins with the value chain model proposed by M.E. Porter (Porter, 2004, pp. 194-196).

As a result of the circumstances indicated above, enterprises decide to translocate and relocate their activities, consolidating their value chain on a global level. Besides, they influence the prevalence of outsourcing of functions in enterprises. This type of implementation of tasks is related to the market-shaping of modern business service centers.

In this article, business services will be treated as shifting the process of providing services to another enterprise under subcontracting, the purpose of which is the strategic use of resources (outsourcing of services) or outside the country of operation of the organization in the field of services provided by internal departments of the enterprise or by a foreign contractor (services offshoring).

However, such services are provided on the condition that information and communication technologies and specialist knowledge are used and subject to the condition that they are provided to organizations not individual recipients (Abramovsky *et al.,* 2004), (Wood, 2005). The development of this type of services is based on electronic information and modern management concepts (Xiao, 2009), (Cheng, 2013).

MBS are considered to be one of the most important components of the Polish economy. Their dynamic development is influenced by the migration of employment mainly from industry and agriculture to the service sector as a result of outsourcing of business functions, progressing competition on global markets, and the creation of modern categories of services. Services of this type are located in the following types of modern business service centers: Shared Services Center (SSC), Business Process Outsourcing (BPO), Information Technology Outsourcing (ITO), Research and Development Center (R&D), Legal Process Outsourcing (LPO), Knowledge Process Outsourcing (KPO) (Sztorc, 2018).

Since the accession of countries from Central and Eastern Europe to the European Union, the global importance of business service centers, especially of those located in these countries, has increased. Poland occupies a special place in the ranking of MBS destinations, being ranked fifteenth among 50 countries in the world (Tholons Services Globalization Index - 2019, 2019, p. 8). On the other hand, in the group of 100 leading cities in the world, the following main capitals of Polish regions are included in the annual rankings: Cracow (11th place), Warsaw (21st), and Wroclaw (92nd) (Tholons Services Globalization Index - 2019, 2019, pp. 10-13).

The key decision related to offshoring and outsourcing of modern business services is the choice of the geographic location of the MBS center because it determines access to resources and affects the operating costs of the organization. Choosing a corporate strategy for business placement is a multifaceted process that requires a thorough analysis of many stimulants (Albertoni *et al.,* 2017, p. 419). The designation of a center location country is influenced by factors such as low labor costs, significant human capital resources, applicable legal and tax regulations, and trends in the economy.

Thus, the decision-making process regarding the location of MBS is distinguished by some multidirectional location factors (Table 1). Their classification focuses on distinguishing a set of hard and soft motifs (Rubalcaba *et al.,* 2013, p. 260).

Table 1. *Key factors in the location of modern business services*

Location factors	The nature and importance of the location theme
Infrastructure	
technical	telecommunications and ICT networks;
educational	the key importance of higher education;
business	standardized office properties;
Country specific factors	
political risk	positive job balance in the economy due to high labor intensity and orientation to foreign markets, consistent with the goals of the policy;
business risk	lack of orientation to the domestic market;
Government policy	

government financial investment incentives	irrelevant - in the corporate structure, entities transferred abroad are cost centers, not profit centers;
Costs	
labor costs	key;
Labor supply	
Human resources	number of employees with the required qualifications; working-age population; knowledge, competencies, and knowledge of foreign languages;
Suppliers	local service providers (service level and quality)
Quality	
Resources	access to modern ICT networks; access to modern office space; transport: rail network and airport accessibility.

Source: *Own elaboration based on Bunyaratavej et al., 2007, pp. 11-12, Ellram et al., 2008, pp. 450-451, Munjal et al., 2018, pp. 489-490.*

The above-mentioned factors also contribute to the choice of location for MBS centers in Central and Eastern Europe, including the Polish market, despite the fact that the selected countries representing this region are characterized by relatively divergent location advantages compared to the country where the investors are based (Duboz *et al.,* 2016, p. 242), (Gál, 2014, pp. 72-73). In addition, the location factors of this type of investment are based on cultural cohesion, geographic proximity, and identical social behavior. In the research on location factors conducted so far, the investors indicate the importance of geographical and cultural proximity as well as friendly and stable conditions for running a business (Sass and Fifekova, 2011, pp. 1597-1599). Nevertheless, cost determinants are nowadays gradually replaced by non-cost factors, e.g. the quality of the workforce, knowledge, information, and knowledge of foreign languages (Baier *et al.,* 2015, p. 155).

Modern business services represent a sector that, despite the economic crisis (2008), epidemic (2019/2020/2021), and investment prudence, is gaining steady growth. In the case of the Polish market, the unfavorable development of road infrastructure does not constitute an obstacle to investments, as the key factors are the qualifications and competencies of employees, substantial telecommunications infrastructure, and large supply of modern office space.

2.2 Smart Specializations in the Development of Regions

In the 1980s and 1990s, traditional theories of growth and development were no longer sufficient to explain the categories of growth and development. Scientists made attempts to search for a new approach to local and regional development to indicate how economic development is proceeding and how it contributes to the shaping of economic geography (Barca, McCann, and Rodriguez-Pose, 2012, pp. 134-152), (Capello and Nijkamp, 2009). The existing theories emphasized, among

other things, the importance of human capital and innovation (endogenous growth theory), agglomeration and distance (new economic geography), and institutions (institutional economics). In addition, globalization has strengthened the importance of local specificities and the material and intangible resources that the competitiveness and innovation of regions are based on (Capello and Nijkamp, 2009), (Rodriguez-Pose and Crescenzi, 2008, pp. 371-388).

It has been important for many governments to maintain a level of competitiveness in a globalized environment, ranging from traditional agriculture to high-tech industrial sectors and modern knowledge-based business (Vanthillo and Verhetsel, 2012, pp. 1-16). In the discourse on changes, it turned out to be crucial to indicate the importance of "*place*" for economic growth and the importance of "*proximity*" to the place of business (Boschma, 2005, pp. 41-45), (Rodriguez-Pose and Crescenzi, 2008, pp. 371-388).

As a consequence of these considerations, the functioning old paradigm of regional policy, which focused on top-down decision-making by governments, somewhat lost its impact, effectiveness, and attractiveness (Barca *et al.,* 2012, pp. 134-152; Wolfe, 2011). Thus, there was a need to reorient the implemented innovation policy towards indicating a new vision of the development of the European Union, which determines the innovative capacity of regions, and, consequently, the effectiveness of the territorial development policy. In opposition to the "top-down approach to regional development", national and regional authorities slowly but surely tried to align their efforts to solve complex territorial problems (Hassink and Klaerding, 2011, pp. 139-149; Tödtling, 2010, pp. 333-343). The result was a clear criticism of the top-down "one size fits all" policy that led the European Union to finance nation-states rather than individual regions and to pursue attractive sectoral goals (Asheim, Grillitsch and Trippl, 2016, pp. 73-97; Tödtling and Trippl, 2005, pp. 1203-1219).

A "new paradigm of regional policy" which is "territorially oriented, multi-level, innovative and adapted to different types of regions" replaced the old one (OECD, 2009; Wintjes and Hollanders, 2010, pp. 1-97). This paradigm shift embraced new goals, a new geographic scope, new governance, and new instruments for regional development policy.

On this basis, the element that integrates the regional and innovation policy of the European Union in the form of the development of innovation within the concept of smart specialization – SS was indicated (Asheim, 2019, pp. 8-25; González-López, Asheim, and Sánchez-Carreira, 2019, pp. 1-7). This concept represents a vision of regional development opportunities based on region-specific capabilities to enable sustainable growth (Foray, 2014; Foray, 2017, pp. 38-50; Rodrik, 2014, pp. 469-491; McCann and Ortega-Argilés, 2015, pp. 1291-1302) and related to a specific territory (Barca, 2009; Foray, David, and Hall, 2009, pp. 20-24; McCann and Ortega-Argilés, 2015, pp. 1291-1302; Foray, Morgan, and Radosevic, 2018, pp. 1-19).

Hence the discourse on the future development of regions has for several past years been dominated by the concept of smart specialization, the main goal of which is the optimal use of the endogenous development potential of countries and regions. The concept of smart specialization assumes that the region should concentrate its development efforts on a limited number of priorities with significant innovative potential. Thus, an important feature of an economic region is its specialization, which can be defined as having a very clearly defined production profile, with an extremely strongly developed sector of the economy or the type of goods produced (Miłek and Nowak, 2015, pp. 115-135).

Smart specialization, an active tool for implementing the Europe 2020 Strategy, is a key concept to avoid wasting EU research funds. The concentration of research, innovative, human, and financial resources should concern innovative sectors characterized by good results of socio-economic development, environmentally friendly, and attractive to investors (Rusu, 2013, pp. 128-136). This concept assumes and promotes the creation of new regional paths by developing more technologically advanced activities with higher added value (Grillitsch and Asheim, 2018, pp. 1638-1662; Balland *et al.,* 2019, pp. 1252-1268; Asheim, 2019, pp. 8-25; Isaksen *et al.,* 2019, pp. 48-65).

This, however, requires a holistic approach that takes into account the complex regional context for industrial transformation, as well as the international and global environment (Hassink, Isaksen, and Trippl, 2019, pp. 1636-1645). Some authors argue that the theoretical framework for smart specialization should center around the concept of linkages (Hidalgo, Klinger, Barabassi, and Hausmann, 2007, pp. 482-487; Neffke, Henning, and Boschma, 2011, pp. 237-265) and complexity of knowledge (Balland and Rigby, 2017, pp. 1-23; Hidalgo and Hausmann, 2009, pp. 10570-10575). However, this framework encompasses the potential risks and benefits to regions of adopting competing diversification strategies (Balland, Boschma, Crespo, and Rigby, 2019, pp. 1252-1268).

It should be emphasized that smart specialization quickly transformed from the concept level to the EU policy along with the allocation of funds for innovations based on structural funds (Estensoro and Larrea, 2016, pp. 1319-1335). Indication of progress in the implementation of the smart specialization concept in practice results mainly from experience in formulating a regional smart specialization strategy (RSS3), implementing RSS3 at the level of regions and countries and assessing EU funding in the area of RSS3 and related policies, including R&D, diversification industrial and innovation policy (Reimeris, 2016, pp. 1561-1583; Iacobucci and Guzzini, 2016, pp. 1511-1526; Radosevic and Ciampi Stancova, 2015, pp. 263-293; Radosevic *at al.,* 2017; Cortinovis *et al.,* 2020, pp. 1165-1205; Cai *et al.,* 2018, pp. 2407-2426; Varga, 2018, pp. 1-12; D'Adda *et al.,* 2019, pp. 1004-1016).

According to the assumptions of the Cohesion Policy for 2014-2020, the concept of smart specialization is of particular importance in the process of regional

development. On this basis, each of the voivodeships in Poland developed a regional smart strategy (RSS3), in which the directions for the development of smart specializations in a given region were identified and outlined.

Existing research and analyses on smart specialization focus on the national, regional, or local level in the context of industrial policy, while services, including modern business services, are still under-researched. The proposal is an attempt to answer the following questions: Can smart specialization in the field of modern business services be used as a strategy for the development of regions? Smart specializations identified and selected at the regional level are indicated in the regional smart strategies. In RSS3 for Polish regions, business services were selected as a regional development strategy in the following three voivodeships: Mazowieckie (Warsaw), Pomeranian (Gdansk) and West Pomeranian (Szczecin) (Dziemianowicz *et al.,* 2014, pp. 74-75).

The article proposes a conceptual framework that can be used to identify and verify priority areas selected under the Regional Innovation Strategies for their assessment. The issue of the implementation of modern business services in the field of regional smart specializations, where regions are expected to diversify structurally. There is therefore a research deficiency regarding the effects of implementing modern business services at the voivodeship level resulting in regional development. The location factors of modern business services are of significant importance, as they indicate the innovative attractiveness of cities within the regions. Smart specialization is expected to create more diversity among regions than a system in which each region tries to create more or less the same by imitation.

3. Research Methodology

3.1 Principal Component Analysis

Principal Component Analysis (PCA) was used to interpret the data collected. It is considered to be a non-parametric method, therefore no assumptions regarding the distribution of the analyzed variables are required. By reducing a significant number of primary variables, PCA enables the implementation of the studied phenomenon while maintaining an optimal scope of information. It reduces the investigated determinants, which remain mutually correlated to a varying degree, to a smaller number of new synthetic variables (so-called principal components) which are collectively uncorrelated, constituting a combination of linear primary variables characterized by the greatest possible variability (Johnson and Wichern, 2007, pp. 367-394; Rencher, 2012, pp. 203-227). Thus, the PCA method is based on the presentation of the input data set by the orthogonal transformation of the input matrix into a linear set of new imperceptible factors according to (Naik, 2018, pp. 19-22):

$$Z_j = b_{j1} S_1 + b_{j2} S_2 + b_{j3} S_3 + \dots + b_{jn} S_n \tag{1}$$

where: z_j – j-th variable (j=1,2,…, n), $S_1…S_n$ – principal components, $b_{j1} … b_{jn}$ – principal components coefficients.

Principal components (PC) are linear functions of primary variables that incorporate, in a descending series, information relating to the structure of data variability. The number of PCs is identified using the scree plot criterion and the Kaiser criterion only for factors with eigenvalues greater than 1. During the analysis, the factors were rotated according to the varimax normalized method. For individual factors, variables with maximum factor loadings for a given factor (with the adopted value of ≥ 0.7) were determined. The graph of coordinates obtained as a result of the analysis reflects the relationships between the objects for the principal components data, while the values of the factor loadings remain the correlation coefficients between the original data and the principal components (Jollffe, 2010, pp. 45-51).

This research compares 19 factors influencing the location of modern business service centers: $x1L$ – total students of public universities (in thousands); $x2L$ – full-time students of public universities - full-time (in thousands); $x3L$ – part-time students of public universities (in thousands); $x4L$ – total students of private universities (in thousands); $x5L$ – full-time students of private universities - full-time (in thousands); $x6L$ – students of extramural studies at non-public universities (in thousands); $x7L$ – total Master's degree graduates (in thousands); $x8L$ – air transport - arrivals (in thousand); $x9L$ – air transport - departures (in thousand); $x10L$ – air transport - transit (in thousand); $x11L$ – air transport - number of passengers handled (in thousand); $x12L$ – enterprises using selected ICT technologies - computers (percent); $x13L$ – enterprises using selected ICT technologies - total Internet access (percentage); $x14L$ – enterprises using selected ICT technologies - access to broadband Internet (percent); $x15L$ – enterprises using selected ICT technologies - use of social media (percentage); $x16L$ – office properties for cities – office space resources (supply in m^2); $x17L$ – office properties for cities – demand for office space (in m^2); $x18L$ – office properties for cities - vacancy rate (in percent); $x19L$ – office properties for cities - base rent in EUR/month/m^2.

For the purpose of this study, the analysis was carried out to 1) reduce the variables for a smaller number of represented and uncorrelated dimensions, obtaining new variables (the so-called principal components), 2) determine the relationship between the variables, 3) order the variables. The application of the PCA method enabled the implementation of an intensified analysis of the collected primary data.

3.2 Hellwig's and Ward's Methodology

To examine the level of development of modern business services in selected Polish cities, the method of development pattern by Hellwig (1972, pp. 115-134) was used, which belongs to the group of taxonomic methods of linear ordering. In this method, the assessment of the level of a multi-feature phenomenon is carried out based on the aggregated synthetic index. Based on the results of the study, the authors attempted

to identify cities for which the MBS sector may constitute a development strategy in the field of smart regional specialization.

The following stages of building the Hellwig's synthetic index were used to assess the level of development of modern business services in Polish cities:

1. Selection of potential diagnostic variables, which was based on substantive, formal, and statistical criteria (Strahl, 2006, p. 33). The set of diagnostic variables[3] consists of stimulants and de-stimulants, with the latter being replaced with stimulants[4].
2. To obtain comparability of diagnostic variables, the values of individual indicators were normalized using the classical standardization of the value of the variable (for stimulants) (Zeliaś, 2000; Panek, 2009).
3. Based on standardized variables, a pattern of the level of development of MBS was determined (abstract P_0 object), which is characterized by the highest values for stimulants.
4. Calculation of the distance of each object (Polish cities) from the P_0 pattern using the Euclidean metric (formula 2):

$$c_{i0} = \sqrt{\sum_{k=1}^{m} (z_{ik} - z_{0k})^2} \quad i = 1, 2, 3, ..., n \tag{2}$$

To normalize the value of the di index, a relative taxonomic measure of development was constructed, which was calculated according to the formula:

$$d_i = 1 - \frac{c_{i0}}{c_0}, \quad i = 1, 2, 3, ..., n \tag{3}$$

where:

d_i - synthetic indicator;

$$c_0 = \bar{c}_0 + 2 \cdot s_0 \tag{4}$$

$\bar{c}_0$, s_0 - arithmetic mean, sequence standard deviation, respectively c_{i0} ($i = 1, 2, 3, ... n$);

The synthetic development measure *di* (3) obtained as a result of the calculations takes values from 0 to 1. The closer the value of the di measure is to 1, the farther the given object (city) is from the model and the higher the level of development of

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[3]*Selected variables were treated as equal, assuming the system of unit weights.*
[4]*The article uses the stimulation of features with the use of transformation in the form of inverting the value of features according to the formula:*
$Xi = \frac{1}{Xi^D}, \quad i = 1, 2, ..., n; j = 1, 2, ..., m$ *(Młodak, 2006).*

modern business services.

The value of the calculated Hellwig's index allowed to rank cities in terms of the level of development of modern business services and to divide cities into four main groups. Groups of cities with the highest, high, low and very low development level were distinguished, classifying them according to the following ranges (Zeliaś, 2000): I - cities with the highest level of development of MBS:

$d_i \geq \bar{d}_\iota + S_{di}$; II - cities with a high level of development of MBS:

$\bar{d}_\iota \leq d_i < \bar{d}_\iota + S_{di}$; III - cities with a low level of development of MBS:

$\bar{d}_\iota - S_{di} \leq d_i < \bar{d}_\iota$; IV - cities with a very low level of development of MBS: $d_i < \bar{d}_\iota - S_{di}$;

where: d_i – value of the synthetic indicator; $\bar{d}_i$ - arithmetic mean of the synthetic index; S_{di} – standard deviation of the synthetic index.

The analysis with the use of the linear ordering method is supplemented by the classification of cities according to a similar level of development of modern business services in Poland, using cluster analysis. It assumes data segmentation to distinguish homogeneous objects of the studied population. Hence, the division of the community into individual groups is carried out in such a way as to obtain clusters in which elements in the same group are similar to each other, and at the same time different from the elements in the other groups (Gatnar and Walesiak, 2004).

Ward's method, belonging to the hierarchical object classification methods, was used to group the cities into clusters. It differs from the others in the hierarchical group in that the analysis of variance is used to determine the distance between the clusters. Ward's method ensures homogeneity within clusters and heterogeneity between clusters (Ward, 1963, pp. 236-244; Strahl, 2006; Młodak, 2006; Szkutnik *et al.,* 2015, p. 58).

The study was carried out based on standardized variables, and the Euclidean distance was used to create clusters. The effects of applying Ward's method were presented in the form of cluster tree – dendrograms (using the Statistica 13.3 program). In the conducted study, the critical value was determined based on an analysis of the agglomeration diagram.

In the first stage, a set of diagnostic variables was selected to assess the level of development of modern business services. The selection of diagnostic variables meets three basic criteria: content-related, formal, and statistical (Strahl, 2006). Taking into account the substantive and formal criteria as well as the current

literature on the subject, a set of the following 13 diagnostic variables was proposed was proposed to examine the level and criteria for the development of MBS in selected Polish cities:

x1- employment structure in service centers in selected centers in Poland, broken down by center type (according to the dominant business profile) - SSC/global business services (GBS); x2 - employment structure in service centers in selected centers in Poland, broken down by center type (according to the dominant business profile) – IT; x3 - employment structure in service centers in selected centers in Poland, broken down by center type (according to the dominant business profile) – BPO; x4 - employment structure in service centers in selected centers in Poland, broken down by center type (according to the dominant business profile) – R&D; x5 - share of individual centers in total employment in service centers in Poland; x6 - employment number of employees in BPO, SSC / GBS, IT, R&D centers in business service centers; x7 - value of the location quotient (LQ) as an indicator of local specialization of selected centers in terms of business services; x8 - average employment in service centers in major business service centers in Poland - the average number of employees in centers; x9 - number of BPO, SSC / GBS, IT, R & D service centers/number of MBS centers located on the Polish market in key business centers; x10 - number of business services centers established from the beginning of the previous year compared to the current year; x11 - total population; x12 - working and mobile age population; x13 - unemployment rate.

Variables selected as diagnostic ones should be characterized by a high level of differentiation and a low level of correlation with other variables. To obtain the final set of variables, they were reduced based on the coefficient of variation and using the Hellwig's parametric method (Młodak, 2006; Hellwig, 1968). Because the threshold value of the coefficient of variation of V = 10% was adopted, none of them were eliminated from the set of potential diagnostic variables, because the coefficient of variation reached higher values.

In 2014, the coefficient of variation ranged from 38.50% to 101.70%, while in 2020 –from 32.22% to 102.31%. Then, the parametric Hellwig's method was used. The threshold value of the Pearson's linear correlation coefficient was set arbitrarily at $r*=0.5$ which caused the following eight variables to be eliminated from the set: x2, x6, x7, x8, x9, x10, x11, and x12.

To calculate the synthetic measure of the level of development of MBS, the following 5 diagnostic variables were finally adopted, with one (x5) being the central variable, and the remaining four (x1, x3, x4, and x13) being isolated variables. Four variables are stimulants (x1, x3, x4 and x5) and the last - x13 is a destimulant. The indicators were adjusted in such a way that the obtained results reflect the most important issues determining the level of development of MBS in selected Polish cities.

4. Results

4.1 Diagnosis of the Location Structure of Modern Business Services with the use of PCA

Based on the collected data covering the years 2014-2018, in the first stage of the research factors that may affect the decision regarding the location of MBS were determined and the regions where it is recommended to implement smart specializations in the field of modern business services were identified. In relation to the research objective, the principal component analysis (PCA) was conducted. In the analyzed set of 11 voivodships, the x1L-x19L variables indicated in the methodology for principal component analysis (see section 3.1) were used.

In the first stage of the research, the principal components were determined for the factors analyzed in individual years. The relationship between the original variables and the generated principal components is shown in Figure 1. In 2014 (Figure 1a), the first component accounted for approximately 71.76% of the variability in the data. In turn, the second component is created by two variables with opposite signs. They show that high values of the factor of enterprises using ICT technologies in the field of computer access correspond to low values of vacant office space in relation to the total supply of office properties for rent in the analyzed cities (vacancy rate), and vice versa. At the same time, the second component informs about data volatility at the level of 11.07%.

Most of the information contained in the data is transferred by the principal components. For this reason, the following factors affecting the location of MBS should be distinguished: enterprises using computers for ICT-related tasks, Master's degree graduates, students of non-public universities, part-time students of private universities, and office space in the analyzed cities. On the other hand, the following localization stimulators of MBS have a strong positive correlation: enterprises with computers – enterprises with Internet access that use the indicated tools for the implementation of new ICT technologies, students of private universities – part-time students of private universities, departures – arrivals in air transport, enterprises using social media – transit in air transport.

On the other hand, among negatively correlated factors, companies with computers that are used to implement ICT– the vacancy rate for office properties in cities should be indicated. The analyzed factors are also distinguished by uncorrelated variables, e.g. enterprises equipped with computers – Master's degree graduates, enterprises with access to broadband Internet – students of private universities, enterprises with Internet access – full-time students of private universities.

Figure 1b presents the principal components analyzed for 2016. The first one represents 68.32%, while the second one 18.48% of the variance, i.e. they together provide 86.8% of the variance of the original variables. The vectors located directly

in the outer district constitute the variables interpreted by the following components: demand for office space in cities – graduates of graduate studies, trips – the number of passengers served in air transport, computer equipment – access to the Internet of enterprises using ICT technologies, computers – access to broadband Internet by the above-mentioned entities.

Figure 1. *Variables of MBS location factors in 2014-2018 in the two-dimensional space of the first and second component*

| a) 2014 | b) 2016 | c) 2018 |
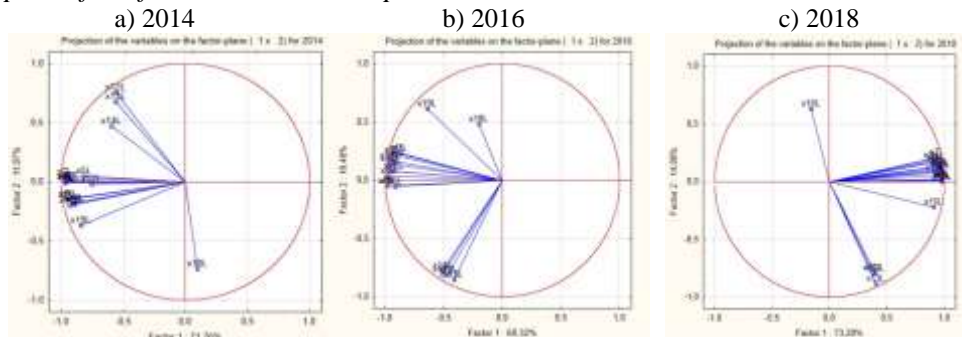
Source: *Own elaboration based on the Statistica 13.3 package.*

Following the read sign of factor loadings, a positive correlation is shown by the components responsible for transit in the case of air transport – part-time students of private universities, demand for office space – supply and resources of office space in the analyzed cities, computers – Internet access in enterprises using selected information and telecommunications, demand for office space in cities – Master's degree graduates, arrivals – the number of passengers served in air transport and the number of passengers served – departures in air transport. In 2016, no factors were pointing to a strong negative correlation. Nevertheless, there were variables informing about the lack of correlation of the studied features, among which the vacant spaces of municipal office properties – full-time students of private universities and the base rent of municipal office properties – arrivals in air transport should be distinguished.

According to the Hotelling's method (Izenman, 2013, pp. 103-129), which uses the test of Lagrange multipliers (Bertsekas, 2010, pp. 53-57) for maximizing multivariable function, in the next analyzed year, i.e., 2018 (see Figure 1c), the first principal component explains 73.28% and the second 14.08% of the variability. In total, the first two values represent 87.36% of the variability of all the studied determinants of the location of modern business service centers.

The vectors located near the circle convey a significant part of the information contained in the input variable carried by the principal components: the use of social media and Internet access by enterprises implementing ICT, rental rates of office properties in the analyzed cities, and arrivals in air transport. The position of the vectors also indicates a positive correlation of variables, which include, broadband

Internet access – computer equipment among enterprises using selected information and telecommunications technologies, departures – arrivals in air transport, students of private universities – demand for office space in the analyzed cities, supply and office space in cities – part-time students of public universities, full-time students of private universities – students of public universities.

In line with the direction of the vectors, the negative correlation concerns the following factors, vacancy of office properties in the analyzed cities – Internet access of enterprises using ICT. On the other hand, the lack of correlation between the variables is evidenced by the determinants responsible for Master's degree graduates – access to the Internet of enterprises using ICT, the number of passengers served in air transport – access to broadband Internet by enterprises using ICT, rent of office properties in the analyzed cities – computer equipment in enterprises using ICT technologies.

The conducted study shows that the key circumstances confirming the attractiveness of the Polish market in terms of the location of MBS centers are two groups of factors: infrastructure and quality. The first of them is represented by technical infrastructure (access to the Internet, including broadband, equipment with computers), educational infrastructure (students of public and private universities, part-time students of public and private universities, Master's degree graduates), and business infrastructure (demand, supply, and office space resources). In turn, the second group focuses on qualitative factors, i.e. resources in the area of access to information and telecommunications technologies, modern office space, and transport, especially air transport.

Depending on the nature of the MBS center, factors influencing their relocation to Poland also include its favorable location in Europe, a favorable time zone to serve other regions, as well as the potential of the labor market and human resources, compared to other countries in the region of Central and Eastern Europe.

Based on the conducted research, the hypothesis that traditional and modern location factors influence the decision on the location of modern business service centers by corporations should be confirmed.

4.2 Analysis of the Stimulators for the Creation of Modern Business Service Centers with the Use of PCA

In the second part of the research, the criteria for shaping modern business service centers were analyzed. Based on the data obtained from the Association of Business Service Leaders (ABSL), the x1-x13 measures were distinguished, which are indicated in subsection 3.2. on the Hellwig's and Ward's methodology. Due to the incompleteness of the data and the inability to obtain them from ABSL for 2016-2018, the analysis covers the years 2014, 2019, and 2020. The PCA method was also

used to determine the most important features influencing the creation of this type of center.

Then, for the analyzed variables, the principal components were determined, whose relationships are presented in Figure 2. The components selected for the analysis explain in total for 2014 – 65.22%, 2019 – 75.15%, 2020 – 78.09% of the total variability of the MBS centers shaping criteria being compared.

Figure 2. *MBS centers shaping criteria in the two-dimensional space of the first and second principal components*

a) 2014   b) 2019   c) 2020
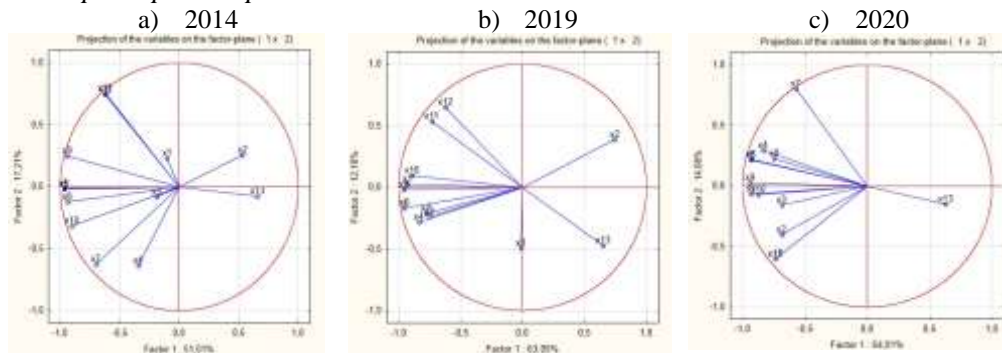
Source: Own elaboration based on the Statistica 13.3 package.

In 2014, (see Figure 2a) the following highly positively correlated variables should be observed: total population – working (mobile) age population, share of individual centers in total employment in service centers in Poland – number of employees in BPO centers, SSC / GBS, IT, R&D in business service centers and the average number of employees in the centers.

In turn, in 2019 (see Figure 2b), a positive correlation concerned the employment structure in service centers in selected centers in Poland, broken down by type of SSC / GBS center – number of service centers established from the beginning of the previous year compared to the current year, location – average number of center employees working in major business service centers – employment structure in service centers by type of center (R&D), total population – working age (mobile) age population.

On the other hand, in 2020 (see Figure 2c), the following variables were characterized by increasing correlation: employment structure in service centers by type of R&D center in relation to the average number of employees of the centers, employment structure in SSC/GBS centers selected by type of center – number of service centers established since the beginning of the previous year compared to the current year, total population – working (mobile) age population, number of BPO, SSC / GBS, IT, R&D service centers located in key business centers – number of

service centers established since the beginning of the previous year compared to the current year.

The conducted research shows that the main criterion influencing the creation of this type of center is the current number of such entities located on the Polish market. In addition, other motives influencing their creation include parameters related to the demographic and social structure (e.g., total population, mobile working-age population), socio-economic structure (e.g., number of employees in MBS centers, average number of employees in centers, average number of employees in main business service centers, employment structure in SSC/GBS, R&D centers) and the structure of entrepreneurial potential and economic attractiveness of cities and regions (e.g., number of centers established in a given year, number of BPO, SSC/GBS, IT centers), R&D located in business centers, number of service centers established at the beginning of the previous year compared to the current year).

The vectors of negatively correlated variables in 2014 corresponded to the following criteria: working (mobile) age population – employment structure in service centers by type of R&D center, employment structure in service centers by type of SSC/GBS center – employment structure in service centers by type of BPO center, number of BPO, SSC/GBS, IT, R&D centers located on the Polish market in key business centers – location quotient value, employment structure in service centers by type of IT center – working-age population (mobile), employment structure in service centers by type of SSC / GBS center – unemployment rate.

On the other hand, in 2019, an increase in the value of one feature is accompanied by a decrease in the average values of the second feature in the case of factors representing working (mobile) age population – employment structure in service centers, broken down by type of R&D center, total population – average number of center employees, number of centers services created from the beginning of the previous year compared to the current year – number of employees employed in BPO, SSC/GBS, IT, R&D centers.

In 2020, a negative correlation was shown by the variables informing about: total population in relation to the value of the location quotient, working (mobile) age population – employment structure in service centers by type of R&D center, employment structure in service centers by type of center– average number of employees of the centers, number of service centers established since the beginning of the previous year compared to the current year – number of BPO, SSC / GBS, IT, R&D service centers.

No relationship between the variables in 2014 was observed in the case of working (mobile) age population versus the employment structure in service centers by type of IT center, employment structure in service centers by type of SSC/GBS center – unemployment rate, working (mobile) age population – number of employees in BPO, SSC/GBS, IT, R&D centers.

This tendency was demonstrated in 2019 by the criteria responsible for: employment structure in business services centers by type of BPO center in relation to unemployment rate, employment structure in service centers by type of IT center – unemployment rate, employment structure in service centers in selected centers by type of BPO center – employment structure in service centers by type of R&D center.

In 2020, on the other hand, there was no visible correlation between the variables that indicate: working (mobile) age population in relation to the employment structure in service centers by type of BPO center, value of the location quotient – number of BPO, SSC/GBS, IT centers, R&D, employment structures in service centers by type of R&D center – employment structures in service centers by type of IT center.

The main criterion for creating MBS is the number of people of working age, the average number of employees in operating centers, and the number of entities that have relocated and expanded to the Polish market with this type of service.

4.3 The Level of Development of Modern Business Services in Selected Polish Cities Based on the Hellwig's Synthetic Index

The calculated synthetic index allows determining groups of cities with a similar level of development of MBS, i.e., cities with the highest, high, low, and very low level of development of MBS (Table 2). The classification of cities according to the Hellwig's synthetic index showed differentiation in the level of development of modern business services. The difference between the maximum value of 0.523 (Wroclaw) and the minimum value of 0.096 (Bydgoszcz) in 2014 was 0.427. In 2020, these values were as follows, maximum 0.759 (Warsaw), minimum – 0.170 (Rzeszow), i.e., the range was 0.589. The synthetic indicator of the level of development of modern business services in 2014 and 2020 for selected Polish cities is presented in Figure 3.

Table 2. *The level of development of modern business services in selected Polish cities in 2014 and 2020 based on the Hellwig's index*

Position	City	d_i 2014	Position	City	d_i 2020
GROUP I					
$d_i \geq 0.439$ - cities with the highest level of development of modern business services			$d_i \geq 0.647$ - cities with the highest level of development of modern business services		
1.	Wroclaw	0.523	1.	Warsaw	0.759
2.	Cracow	0.473	2.	Cracow	0.703
GROUP II					
$0.293 \leq d_i < 0.439$ - cities with a high level of development of modern business services			$0.431 \leq d_i < 0.647$ - cities with a high level of development of modern business services		

3.	Warsaw	0.408	**3.**	Wroclaw	0.638
4.	Tricity	0.391	**4.**	Poznan	0.581
5.	Poznan	0.314	**5.**	Tricity	0.482
6.	Lodz	0.297			
GROUP III					
0.146 ≤ d_i < 0.293 - cities with a low level of development of modern business services			**0.216 ≤ d_i < 0.431- cities with a low level of development of modern business services**		
7.	Katowice agglomeration	0.272	**6.**	Lodz	0.395
8.	Rzeszow	0.184	**7.**	Katowice agglomeration	0.369
9.	Szczecin	0.160	**8.**	Szczecin	0.258
GROUP IV					
d_i < 0.146 - cities with a very low level of development of modern business services			**d_i < 0.216 - cities with a very low level of development of modern business services**		
10.	Lublin	0.101	**9.**	Lublin	0.206
11.	Bydgoszcz	0.096	**10.**	Bydgoszcz	0.184
			11.	Rzeszow	0.170

Source: *Own elaboration based on Raport 10 lat sektora nowoczesnych usług biznesowych w Polsce, pp.12-17, Sektor nowoczesnych usług biznesowych w Polsce 2014, 2014, pp. 8-16, Sektor nowoczesnych usług biznesowych w Polsce 2020, 2020, pp. 18-26.*

In 2020, compared to 2014, there was an increase in the level of development of modern business services in the 10 analyzed cities, with the decrease in the indicator for the city of Rzeszow only. 5 units improved their position in the ranking of cities, 3 maintained their position unchanged, and also 3 dropped down. The calculated synthetic indicator for 2014 and 2020 was arranged linearly according to non-increasing values and became the basis for distinguishing groups of cities: with the highest, high, low, and very low level of modern development business services (see Table 2).

Figure 2. *Synthetic indicator of modern business services in 2014 and 2020 in selected Polish cities*
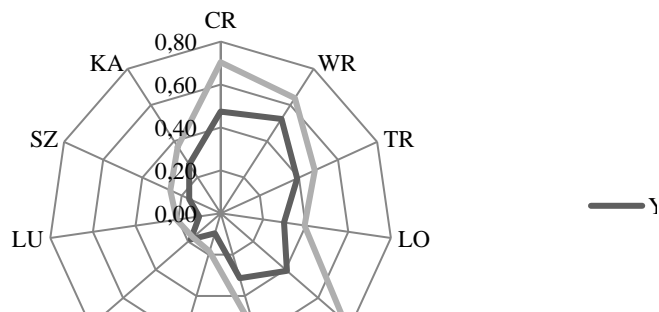
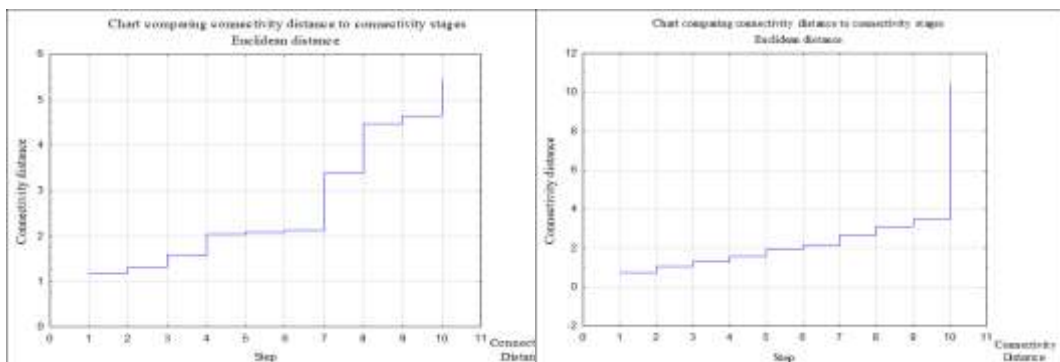**Source:** *Own elaboration based on data from Table 2.*

In both rankings, Cracow was in the group with the highest level of development of modern business services, with Warsaw being promoted to this group in 2020, while in 2014, Wroclaw ranked first in this group. The second group consisted in 2014 of the following four cities: Warsaw, the Tricity, Poznan, and Lodz, and in the second analyzed year only Poznan and the Tricity remained in this group, as in 2020 Warsaw was promoted to the group with the indicator $d_i \geq 0.647$, and Lodz ranked first in group 3. The third group, which reflects the low level of development of MBS in both 2014 and 2020, comprised three cities. The last group, with a very low level of development of modern business services, included Lublin and Bydgoszcz in both analyzed years, while in the second analyzed year this group also included Rzeszow with the Hellwig's index value of 0.170.

The most favorable level of development of modern business services is characteristic of Wroclaw, Warsaw, and Cracow (Table 2). In both analyzed years, the level of service development places the first two cities in the leading position in the ranking, with Wroclaw ranking first in 2014, Warsaw in 2020, and Cracow invariably ranking second. It is noted that the distance between them in both analyzed years remained at a similar level. The lowest level of development of MBS is shown in 2020 in Rzeszow, with Bydgoszcz ranking second to the last in both analyzed years.

4.4 The Similarity of Cities in Poland in Terms of the Level of Development of Modern Business Services Using the Ward's Method

The Ward's method used allows designating groups of countries with a similar level of development of MBS. The analysis of the agglomeration diagram for 2014 shows that the dendrogram division should be placed on step 7 (Figure 4), i.e., the bond distance is between 2 and 3.5. The dendrogram cut-off point for bonding distance was set at 3 for the study.

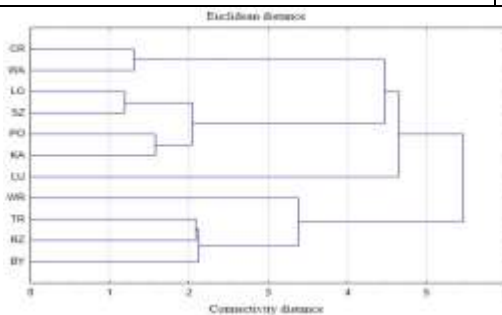**Figure 4.** *Agglomeration chart for 2014*   **Figure 5.** *Agglomeration chart for 2020*

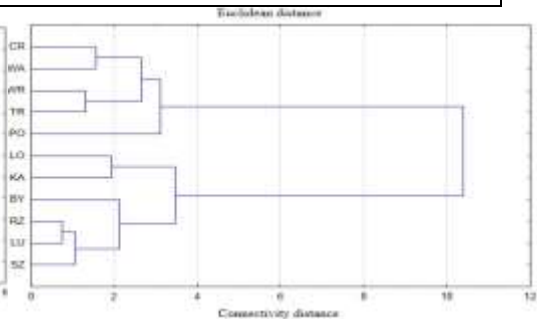**Source:** *Own elaboration based on the Statistica 13.3 package.*

On this basis, five clusters were identified in 2014 (Figure 6). The following groups were formed in the classification of regions: one- (two clusters), two- and four-element (two clusters). The first group was made up of two cities, Cracow and Warsaw, which show similarities in terms of x1 and x3. The second cluster was composed of: Lodz, Szczecin, Poznan, and the Katowice agglomeration, characterized by belonging to Groups 1 and 3 based on the Hellwig's index.

The city of Lublin created another, independent cluster, which in the taxonomic analysis was classified as a unit with a very low level of development of MBS. The distinctiveness of Lublin's clustering is due to the poor results compared to other cities, especially the number of working and mobile age population and the number of service centers established from the beginning of 2013 to 2014. Similarly, the analyzed unit lags behind in terms of the employment structure in service centers in selected cities in Poland, broken down by type of center – BPO in %. Wroclaw also created an independent cluster, but its distinctiveness resulted from the highest number of service centers established from the beginning of 2013 to 2014 (33) and the high values of x3 and x5 indicators in the cluster analysis. Based on the Hellwig's index, the city ranked first in the year under study. The next group consisted of the following cities: the Tricity, Rzeszow, and Bydgoszcz, which showed similarities in terms of the variables x1, x3, and x4.

Figure 3. *Classification of selected cities according to the level of development of MBS in 2014 based on the Ward's method*	**Figure 4.** *Classification of selected cities according to the level of development of MBS in 2020 based on the Ward's method*

Source: *Own elaboration based on the Statistica 13.3 package.*　　**Source:** *Own elaboration based on the Statistica 13.3 package.*

The analysis of the agglomeration chart for 2020 justifies the division of the dendrogram at step 10 (Figure 5), i.e., the bonding distance ranges from around 3 to 11. For a bonding distance of 3, four groups of relatively homogeneous objects with different abundance appear.

The first group brings together the four-element class of objects, i.e., Cracow, Warsaw, Wroclaw, and the Tricity, which are characterized by comparable values of the variables (Figure 7). Identification of this cluster seems to depend to a large extent on belonging to a group with the highest and high level of development of modern business services. A separate group, the second, was formed by the city of Poznan, which obtained a very high value of the variables x1 and x3. The third group is composed of two units, Lodz and the Katowice agglomeration. They belong to group 3, i.e., with a low level of development of modern business services according to the Hellwig's synthetic indicator, and they ranked 6th, and 7th respectively. Identification of four further sites, Bydgoszcz, Rzeszow, Lublin, and Szczecin depends on belonging to group 4 i.e., cities with a very low level of development of modern business services – the first three ranked 9th, 10th and 11th respectively, with Szczecin ranking last in group 3.

The resulting clusters show some similarities to the groups of cities created based on the measure of the development pattern. Particularly noteworthy is the fact that Lublin in 2014 and Poznan in 2020 formed an independent group, which means that they differ in the level of development of modern business services from the other objects. The distinctiveness of Lublin resulting from the analysis using Ward's method, with the variables with the lowest values being dominant, coincides with the results of the taxonomic analysis which placed this city in to the group of objects with the lowest level of development of the studied phenomenon. On the other hand, Poznan, ranked high in the ranking based on the development pattern in 2020, creates a separate cluster using Ward's method, which means that it differs in the level of development of the analyzed services from the other objects studied.

5. Discussion

The conducted research procedure allowed for the verification of the hypothesis and the implementation of the assumed cognitive goal specified in the introduction. Modern business service centers constitute a dynamically developing sector of services in the economy, employing educated specialists and experts. There are many different types of foreign entities providing business services that are currently operating on the Polish market. Their expansion has significantly influenced the growth of the regions and of the outsourcing and offshoring services market. Nevertheless, domestic enterprises successfully implement the business models indicated by international organizations. They provide a wide range of specialized services based on knowledge and modern technologies.

Many different variables are taken into account in the decision-making process regarding the location of MBS centers. Due to the progressive globalization, economic and social changes, qualitative factors are categorized in parallel with typical cost factors. Nevertheless, traditional location determinants should not be underestimated in the process of MBS relocation, although the essence of some cost factors is reduced as a result of, among others, the development of transport or

mechanization of work. At the same time, changes taking place in the environment, the fast pace of market and enterprise development contribute to the activation of new MBS location factors, such as human capital and knowledge, as well as access to IT and transport infrastructure.

The conducted research shows that modern business services constitute one of the development strategies of Polish regions from the perspective of the adopted smart specializations of regions, which results from the following premises:

1.The development of MBS centers results in the creation of new jobs, the flow of know-how, and innovations based on new technologies.
2. The determinants of the location of MBS centers include the number of students of public universities in a given region and access to transport and technical infrastructure (air transport, access to office space and broadband Internet).
3. The key locations for the operation of MBS centers are the seven metropolitan areas of Cracow, Warsaw, Wroclaw, the Tricity, Lodz, the Katowice agglomeration, and Poznan.
4. The basic MBS centers shaping criteria include the size of the mobile working age population, the number of identical centers operating, the employment structure in the centers, and the unemployment rate in a given area.
5. In the analyzed years, based on the value of the Hellwig's synthetic index, there was an increase in the level of development of modern business services in the ten analyzed cities, which may indicate high economic, innovative and competitive potential of the regions where the studied cities are located. This potential of the MBS should be effectively used for the intelligent development of regions/cities.

It should be noted that the MBS sector is currently one of the priorities for the development of regions in terms of smart specialization and this statement is confirmed by the research. Nevertheless, like in the case of other areas of activity carried out on the Polish market, it will be dependent on the economic prosperity in the long term. For this reason, metropolitan managers should implement strategies encouraging investments in these regions when market trends change so as to leverage the infrastructure and human capital left behind by MBS centers.

The research shows that traditional and modern location factors influence the decision regarding the location of modern business service centers. Therefore, they allow us to confirm the hypothesis. The article analyzes the cities located both in the regions that have chosen smart specializations related to business services as an innovative strategy (Warsaw, Gdansk – the Tricity, and Szczecin), and those that have not chosen MBS as their smart specialization. The results of the research confirmed that over the analyzed years, modern business services have developed both in regions that defined MBS as smart specialization in the RSS3 and in voivodeships where they were not indicated as a priority of smart specialization policy (RSS3) under the reformed cohesion policy EU.

The results of the statistical analysis concerning the study on the level of development of modern business services in selected Polish cities provide decision-makers with substantive knowledge necessary to make decisions of national importance. This is closely related to the national decision-making management functions. They can also be a source of information for the European Union in the context of infrastructure retrofitting for the development of the analyzed services and, consequently, they can help make decisions regarding financial support, i.e., directing EU funds to regions/cities.

On the other hand, decisions related to investing capital in Poland by foreign investors depend, among others, on the attractiveness of regions/cities in the analyzed aspect. The indicated research results can be used for comparative analyzes of Polish voivodships/cities with regions/cities of other countries, e.g. of the European Union.

In the light of the literature on the subject, the "process of discovering entrepreneurship" is considered a key element of the Smart Specialization Strategy. It shows the involvement of stakeholders in the design of innovative development policy with the aim of "discovering" and identifying new or existing priorities for investment in innovation (e.g. modern business services), based on the region's strengths and market trends.

However, it should be emphasized that, in the light of the research, this principle is one of the most demanding for regions (or countries) to implement, and interaction between stakeholders is even more difficult in times of physical distance as a result of the COVID-19 pandemic (Laranja, Marques Santos, Edwards, and Foray, 2021, pp. 1-30). The significant changes in the level of regional development to date, including the development of modern business services, have recently been overshadowed by the Covid-19 pandemic (Bailey *et al.,* 2020a, pp. 1163-1174; Bailey *et al.,* 2020b, pp. 1-4).

The economic impact of the pandemic will be unevenly distributed at the regional level depending on the local industrial base and general regional conditions (KPMG, 2020). The current crisis is undoubtedly regional and has serious consequences for, among others, the economy, welfare, transport, everyday life, or the practice and publication of regional research (Bailey and Tomlinson, 2020, pp. 154-159; Parkinson, 2020). Regional analyzes will be necessary to fully understand and manage the uneven effects of the coronavirus pandemic (also in terms of smart specializations and modern business services).

Thus, in the face of the turbulent present and the uncertain future, the essence and development of modern business services as a development strategy will continue to occupy a special position in the socio-economic development of regions/cities, as well as internationalization and international expansion of enterprises.

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