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# The Delimitation of Bipolar Metropolitan Area Within the Kujawsko-Pomorskie Region

**JEL Classification:** *O1, R11*

**Keywords:** *delimitation, metropolitan area, synthetic measure of development*

**Abstract:** *The objective of the article was to re-define the bipolar metropolitan area within the area of the Kujawsko-Pomorskie region (NUTS 2). Concentration of metropolitan features, as well as socio-economic situations of its communes (NUTS 5) in 2011, and also the dynamics of communes' development in the period 2009-2011 were considered in the procedure of delimitation. Bydgoszcz and Toruń, as the economically strongest cities in the region, were established as the dual core of the bipolar metropolitan area. It was assumed that the determined metropolitan area would cover the best developed and the fastest developing communes which met the following criteria of a metropolitan area: neighbourhood, continuity, compactness, maximum distance and population.*



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*The development levels of the communes were determined with the use of synthetic measure. Its values were calculated considering the economic (e.g. the amount of income) and also social (e.g. unemployment) aspects of regional development, as well as features typical of metropolitan areas, such as: well-developed sectors of R&D, knowledge-based economy and serving superior services. In the research, linear arrangement methods classifying as taxonomic tools of multivariate data analysis was applied.*

*The metropolitan area resulting from the research (BipOM) slightly differs from the Bydgoszcz-Toruń Metropolitan Area (B-TOM) which was formally appointed in 2005 and composed all of the communes located within the area of the Bydgoski and Toruński districts (NUTS 4). Chełmża and Koronowo, as the less developed communes of the districts, were excluded from the new metropolitan area, while the communes of Ciechocinek, Nakło and Unisław, belonging to the neighbouring districts of the region, were included in the BipOM due to their significant level of regional development and its dynamics. Furthermore the Inowrocław district (bordered on the BipOM) was identified as the prospective candidate for the BipOM, due to the fact that its communes demonstrate a high potential for regional development.*

## Introduction

The significance of metropolitan areas, as one of the most essential factors of socio-economic development, which significantly affects regional competitiveness, is emphasized in the literature regarding regional policy and development. The Bydgosko-Toruński agglomeration located within the area of the Kujawsko-Pomorskie region was contained in The Concept of Spatial Development of Poland, the spatial development plan of the region and also research papers of the Polish Metropolis Union.

In 2005 in the Kujawsko-Pomorskie region, a Partnership Arrangement was signed. Its main objective was to establish a cooperation between local governments for the benefit of the Bydgosko-Toruński Metropolitan Area (B-TOM). The B-TOM constitutes a specific metropolitan area which is nationally unique due to its bipolar character.

The results of the previous research carried out by Müller-Frączek, Pietrzak (2008, 2009a, 2009b) delivered the following significant conclusion. The favourable impact of the cities of Bydgoszcz and Toruń on nearby communes exceeds the area of the B-TOM. Thus inspiration was provided to re-define the borders of the Bydgosko-Toruński Metropolitan Area.

Multivariate data analysis methods, such as linear arrangement methods, were applied in the analysis. Economic, as well as social aspects of regional development of communes, which are located within the area of the Kujawsko-Pomorskie region were examined. The levels of regional devel-

opment of communes and their dynamics were determined on the basis of the values of a synthetic measure. It was assumed that the determined metropolitan area would cover the best developed and the fastest developing communes. Delimitating new borders of the metropolitan area was based on the following criteria applying to a contemporary metropolitan area: neighbourhood, continuity, compactness, maximum distance and population.

## The Impact of Metropolitan Areas on Regional Development

Metropolitan areas are nowadays the most significant economic, scientific, cultural, administrative and political centres in the world. They produce the largest development impulses due to the highest economic development level within their areas, and also performing significant flows of innovativeness and creativity between them and their environment.

Densely populated cities affect high concentrations of institutions and entities serving diversified services to satisfy needs and expectations of their inhabitants. For that reason they become the centres (hearts) of regions. Jane Jacobs wrote that "…Cities are mothers of development (…) due to the density. In cities we can find the concentration of needs and more initiatives of reacting to problems in the new way. This is exactly the essence of development (…)" (cited after Ładysz, 2009, p. 95).

For that reason, the demographic potential, which constitutes the *sine qua non* condition of a metropolitan area's development, plays a significant role. In Poland, in the cities of Warsaw, Poznań, Wrocław and Cracow, located respectively in the Mazowieckie, Wielkopolskie, Dolnośląskiego and Małopolskie region (NUTS 2), there live over 25% of the population of the regions (one in four inhabitants comes from a metropolis) 52% to 77% of population of the regions lives within metropolitan areas (see: Ładysz, 2009, p. 96).

There are bilateral population migration flows between the centre of a metropolitan area and its surroundings. Some transport facilities are also provided (see Ładysz, 2009, p. 97), as well as big trade centres providing a plethora of market services.

The inflow of new inhabitants results in an increase in the standard of living in the surroundings, e.g. by developing technical infrastructure (e.g. sewerage systems, road networks etc.) and providing social (educational, health care, cultural) services. Suburbanization process significantly affects the range of action represented by the central city. Migration movements, both intra- and interregional ones, occur simultaneously, where the impact

of metropolitan areas functions as a basic determinant of the level of migration. The problem of migrations and the findings of the studies are presented in the works Bal-Domańska and Wilk (2011), Matusik et.al. (2012), Pietrzak et.al. (2012), Pietrzak et al. (2012), Pietrzak et.al. (2013), Pietrzak et.al., (2013a, 2013b), Pietrzak et.al. (2013), Pietrzak and Wilk (2013), Wilk and Pietrzak (2013, 2014) and Wilk et.al. (2013).

The communes located in the impact area of a metropolis also gain benefits as well. Growing population leads to developing economic activities (about half of economic entities registered in REGON come from metropolitan areas) which, consequently, also affects increasing incomes of local government units (incomes per capita, denoted by communes neighbouring metropolitan areas, are usually higher than in other areas) (see: Walczak, Pietrzak, 2011). Ultimately, however, with the passage of time the social and economic situation in the regions, in particular on the job market, gets better. (see: Pietrzak, 2010, 2011, 2013; Müller-Frączek, Pietrzak, 2011a, 2011b, 2012a, 2012b, 2013; Pietrzak et al., 2014). This confirms, as V. Blache proved, that ”a region is created by its central unit” (see Berezowski, 1988).

Formulation of metropolitan features in a region is determined by development and concentration of the following factors: transport networks (airports, roads etc.), economic activity, higher education institutions, B&R sector, creative industries, well-qualified human capital, trade sector, cultural and scientific institutions.

Within a developing metropolitan area, the processes of economy despecialization and de-industrialization, developing service sector (in particular finance services) and mass media are seen (see: Smętkowski et al., 2008).

The concentration of economic functions, job offers and diversified services affects intensifying relationships between the central area and its surroundings and the whole region (see: Heffner, 2009). The synergy effect constitutes additional factors of regional development (see: Hołuj, Hołuj, 2006). The metropolis acquires recreation and construction grounds, labour force, financial resources, food products etc. from its surroundings. Whereas the surroundings of the metropolis gain new jobs, superior services which would not be possible without the existing metropolis (see: Smętkowski, 2007a).

Metropolises perform endogenous functions and are parts of territorial organizations. They do not only affect the local environment, but also become a significant factor of competition between regions and countries. The whole region is, to some extent, subordinated to the metropolis due to the re-distribution of resources. The role of a metropolis may be compared

with a role of "portal" by which a region communicates with the world (see: Heffner, 2011).

Metropolises used to be seen as a machine of economic growth and development of whole regions, but actually many researchers have indicated the disadvantages of their influence on the situation in the whole regions. Polish metropolitan areas significantly affect suburbanization areas rather than the whole regions. Therefore the economic situation of metropolitan areas is significantly improving, while the economic situation of the rest of the area is getting worse (see: Heffner, 2011).

Metropolises are usually strongly associated with each other rather than with their surroundings. One of the effects of development processes may also be weakening or, even, breaking relationships between the metropolis and its surroundings (see: Jałowiecki, 2007). It results from the occurrence of significant disproportions in socio-economic development of both comparing parts of a region (see Heffner, 2010). This is noticed in some Polish regions, e.g. the Mazowieckie region, in which the Warsaw metropolitan area is the most significant economically developed area, while its surroundings are becoming impoverished (see Smętkowski, 2007b; Fujita, Thisse, 2002).

## Polish Metropolitan Areas

Dynamic changes of national economies and societies result in the concentration of population and material resources within the area of the biggest cities and their surroundings. These processes lead to the formation of metropolitan areas. The significance of metropolitan areas is emphasized in many strategic documents such as the Long-term Development Strategy of the State: Poland 2030, the Concept of Spatial Development of the State 2030 and also the National Strategy of Regional Development 2010-2020: Regions, Cities, Rural Areas.

10 main metropolitan areas in Poland are identified: Warsaw, Silesia Agglomeration, Cracow, Łódź, Tricity, Poznań, Wrocław, Szczecin, Lublin and the B-TOM (KPZK 2030, after Green Book regarding Metropolitan Areas). None of them, even the city of Warsaw, meets all the criteria applying to metropolis (see Jałowiecki, 1999), which was proved by Maik (2003) who has examined the features typical of international metropolises.

Parysek (2003) proved that only the city of Warsaw demonstrates such significant economic potential to become an international metropolis. Currently Warsaw is referred to as sub-continental metropolis, while the cities of Poznań, Cracow, Wrocław and the Tricity are national metropolis which,

due to achieving significant progresses of economic development, may become sub-continental metropolis by 2020.

Markowski and Marszał (2006) proposed defining a metropolitan area, under Polish conditions, on the basis of the following criteria: above 0.5 million population, very well developed sector of superior services, high innovation potential, proving metropolitan functions not only within a national range, but globally as well.

On the other hand, Wolaniuk (1997) defines metropolitan area as a territory around a metropolis. It differs from the other colonial units by the concentration of metropolitan functions. In his opinion, metropolitan area should not be defined on the basis of the population criteria but considering institutional criteria (large accumulation of metropolitan institutions in a relatively small area).

However, Polish metropolitan areas, as mentioned in many research studies, demonstrate a significant position and impact on nearer and farther environments, affecting development of interrelationships. The most significant potential (apart from the city of Warsaw) is shown by the cities of Cracow, Wrocław, Poznań, and also – as Jałowiecki (2000) noticed – the Tricity and Łódź, Szczecin and the Silesia Conurbation (see: Gorzelak, Smętkowski 2005; ESPON 2004), as well as Białystok, Lublin, Rzeszów and the Bydgosko-Toruński agglomeration (see: Kołodziejski 2001).

Metropolitan areas (also defined by R. McKenzie as regions, after Gawryszewski et.al., 1995, pp. 84-85) and metropolises are discussed and examined in many research studies. Jałowiecki (2002), Parysek (2003) and Maik (2003) indicated features typical of metropolises, while Maik (1997), Liszewski (1987), Gawryszewski et.al. (1998), Kuciński (1990) and Korcelii (1976) carried out studies regarding their range of influence and interactions with the other environment.

A significant contribution to the research regarding metropolitan areas comes from the studies presented by Krzysztofik and Runge (2011), Markowski and Marszał (2006), Smętkowski (2007), Swianiewicz and Lackowska (2007), Smętkowskio et.al. (2008), Liszewski (2005) and Maik (2010). They examined the problem of delimitation of metropolitan areas and, amongst other things, made an attempt to indicate relevant diagnostic features.

The term of metropolitan area has existed in Polish law since 2003. It was specified in the Act regarding spatial planning and developing, established on 27$^{th}$ March 2003. According to this document, a metropolitan area is defined as the area covering a big city with a functionally related environment. The Concept of Spatial Development of the State introduced

a more precise definition of metropolitan area regarding the following criteria:

- population – the population of the centre of a metropolitan area with its surrounding functional area is 500 thousand or more,
- level and dynamics of development – communes included in the metropolitan area represent a high level of economic development and its dynamics since 1995.

Furthermore, the delimitation of a metropolitan area is based on the following rules. The communes which form a metropolitan area:

- are located 50 kilometers or less from the centre of the metropolitan area (approximately half an hour from the edge of the centre) – maximum distance criterion,
- directly adjoin with the center – neighbourhood criterion,
- directly, or through the other communes belonging to the metropolitan area, adjoin with the metropolitan area – continuity criterion,
- adjoin with communes belonging to the metropolitan area – compactness criterion,

## Methodology of the Research

In the investigation, statistical data provided by Local Data Bank of the Central Statistical Office of Poland was examined. The analysis covered 144 communes located within the Kujawsko-Pomorskie region and concerned the period 2009-2011.

The selection procedure of communes, which represent prospective metropolitan area, was based on the values of synthetic measure proposed by Hellwig (1968). It was constructed on the basis of a set of features, characterized functions and impacts typical of a metropolitan area. It was impossible to include all significant determinants due to the insufficient availability of empirical and comparative data, as well as their substantive value.

One of the most significant features of metropolitan area is high developed R&D sector, knowledge-based economy and serving superior services. The empirical material covering these aspects was provided for the year 2009 and later (as an indicator: the amount of entities registered in REGON according to PKD 2007 classification of economic activity).

There also appeared the problem of data aggregation. A part of data, which was significant to carrying out the investigation, is not provided at local territorial level (NUTS 4, NUTS 5), in particular the data describing the communes (NUTS 5).

The data regarding the amount of commutes, as well as net migration, which have been examined in similar research studies, was excluded from the scope of the investigation. The data regarding commutes were exclusively provided by the public statistics until the year 2006, which does not cover the period of the research. At the same time, the data regarding net migration makes it impossible to distinguish migrations within the potential metropolitan area and migration outflows from the area to the outside.

All the selected diagnostic features were statistically and essentially validated. Variables representing low statistical variability were excluded from further analyses. The statistical correlation and its significance were also examined. Data reduction was performed with the use of Bartosiewicz's method. All the variables representing the final empirical set satisfy the demand of maximum spatial and temporal dispersion, and also the lack of collinearity criterion (see Podolec, Zając, 1978, p.25).

The set of collected data describes the following categories affecting regional development:

- demographical potential of communes:
  - population density,
  - age dependency ratio (post-working age population in relation to 100 working age persons)
- local labour markets:
  - the share of registered unemployment people in the working age population,
  - the number of economic entities registered in REGON in relation to 1,000 inhabitants,
- quality of life:
  - the number of apartments in use in relation to 1,000 inhabitants,
  - the share of people using sewerage system in the total population,
  - the number of retail entities (section G, part 47[1]) in relation to 1,000 inhabitants,
- economic development level:
  - own incomes of communes per capita,
  - investment expenditures per capita,

[1] According to the Polish classification of economic activity appointed in 2007 (PKD 2007).

- R&D and superior services:
  - the share of entities classified to R&D and IT branches (sections: J, M with parts 70, 72, 73) in the total number of economic entities,
  - the share of entities providing finance services and insurances (section K) and also culture and entertainment services (section R) in the total number of economic entities.

The levels of regional development represented by communes were determined with the application of a synthetic measure. Aggregated values were calculated on the basis of the set of selected diagnostic features. Results of the measurement served to arrange communes regarding their socio-economic situation (see Zeliaś, 2000, p. 94), as well as define classes representing different levels of economic development and also its dynamics. All calculations were preceded by setting financial data in constant prices of 2009, data normalization, and also data unification (converting destimulants into stimulants).

Economic situations of communes were related to the pattern objects. Ideal (artificial) objects were defined in the years 2009 and 2011. Maximum values of unified variables were assumed as pattern values (reference points). The statistical distances (dissimilarities) between each commune and the pattern object (separately in 2009 and 2010), with the use of Euclidean distance, were calculated. Results of the measurement served to determine values of the synthetic variables calculated with the use of Hellwig's measure, which is formed in the following way:

$$m_i = 1 - \frac{d_i}{\overline{d} + 2s_d} \tag{1}$$

where:

$m_i$ – the synthetic measure of regional development observed in an object (commune) $i$,

$d_i$ – the value of Euclidean distance between an object $i$ and the pattern object,

$\overline{d}$ – the average distance of the set of objects from the pattern object,

$s_d$ – the value of standard deviation of distances observed for the set of objects.

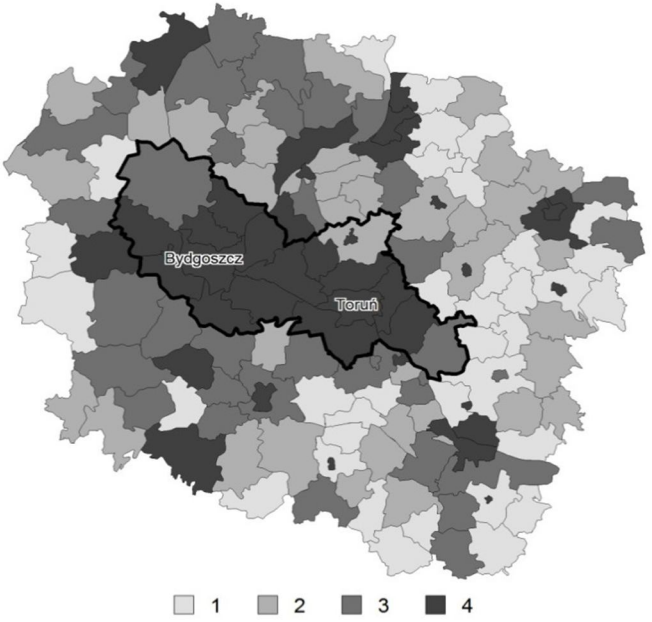
The synthetic measure takes the values within the range [0, 1]. The higher the values of synthetic measure, the higher the level of regional development represented by a commune. The value of 1 is obtained by the

commune which represents the higher values of all unified variables, while the value of 0 is noted by the commune in which unified variables' implementations took the lowest values.

The results of the measurement were presented in Annex 1. The values of the synthetic measure served to determine the levels of regional development represented by communes located within the Kujawsko-Pomorski region. Ranks and classes of communes in 2011, as well as the dynamics of synthetic measure values in the period 2009-2011, were also determined.

Communes were divided into four classes (I, II, III, IV), distinguished on the basis of quartiles, which represent respectively high, moderate, weak and very weak levels of regional development (see Figure 1). Communes, which were grouped into the fourth class, represent the highest level of regional development within the whole region.

**Figure 1.** Classes representing levels of regional development in communes of the Kujawsko-Pomorski region in 2011



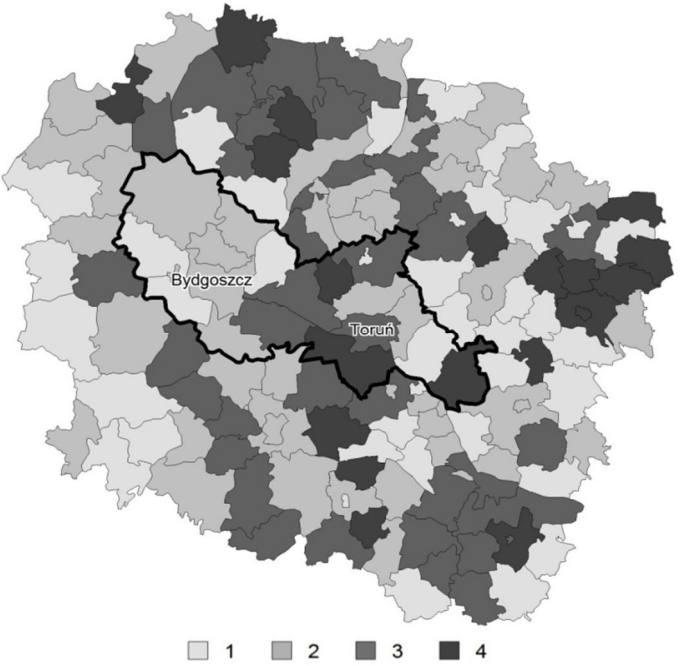

1 – communes representing very weak level of regional development (class I),
2 – communes representing weak level of regional development (class II),
3 – communes representing moderate level of regional development (class III),
4 – communes representing high level of regional development (class IV).

The bold line identifies borders of the B-TOM according to the Concept of Spatial Development of the Kujawsko-Pomorski region.

Source: Authors' compilation.

The dynamics of regional development was examined as well. The values of the dynamics measure were calculated by dividing the synthetic measure values observed in 2011 by the synthetic measure values noted in 2009. Communes were grouped into four classes (I, II, III, IV) representing different direction and size of changes of regional development (see: Figure 2). Communes representing the fourth class noted the highest values of the dynamics measure. However, the significant progress of regional development is demonstrated only by 13 communes for whose the measure took values higher than 1. The decrease of values of the measure was noted by all other communes (91%) while the highest recourse was demonstrated by communes of the first class.

**Figure 2.** Classes representing dynamics of regional development in communes of the Kujawsko-Pomorski region in the period 2009-2011




1 – communes demonstrating significant recourse of regional development (class I),
2 – communes demonstrating moderate recourse of regional development (class II),
3 – communes demonstrating slight recourse of regional development (class III),
4 – communes demonstrating progress of regional development or relatively stable situation (class IV).

The bold line identifies borders of the B-TOM according to the Concept of Spatial Development of the Kujawsko-Pomorski region.

Source: Authors' compilation.

## Result of the research

The aim of the research was to delimitate the bipolar metropolitan area within the Kujawsko-Pomorskie region under current socio-economic conditions. The biggest and best developed cities located within the region – Bydgoszcz and Toruń – composed the dual core of the metropolitan area.

The communes which satisfied all the criteria defining metropolitan area were searched for. Only the communes demonstrating a high level of regional development and also progressive or stable socio-economic situation were taken into consideration. Both criteria are satisfied by communes belonged to the fourth classes regarding the level and also the dynamics of regional development.

All the above mentioned communes directly border a metropolitan centre and therefore they satisfy the neighbourhood criterion. Well-developed communes which adjoin the metropolitan area were also included due to satisfying the continuity criterion, as well as the compactness criterion.

The geographical distances of communes located extremely faraway from the nearest core do not exceed 50 kilometers, and this satisfies the maximum distance criterion. Actually, no other metropolitan area is located near to the cities of Bydgoszcz and Toruń. Therefore the separation criterion is automatically met. Furthermore the population criterion is met as well. Approximately 775.9 thousand inhabitants were living (were formally registered for permanent residence) in communes located within the BipOM in 2011.

The re-defined metropolitan area (BipOM) in comparison with the original metropolitan area (B-TOM) is presented in Figure 3. The BipOM is represented by 19 communes[2] located within the following districts:

- aleksandrowski: Ciechocinek (1),
- bydgoski: Białe Błota (2), Bydgoszcz (1), Dąbrowa Chełmińska (2), Dobrcz (2), Nowa Wieś Wielka (2), Osielsko (2), Sicienko (2), Solec Kujawski (3),
- chełmiński: Unisław (2),
- nakielski: Nakło nad Notecią (3),
- toruński: Czernikowo (2), Lubicz (2), Łubianka (2), Łysomice (2), Obrowo (2), Toruń (1), Wielka Nieszawka (2), Zławieś Wielka (2).

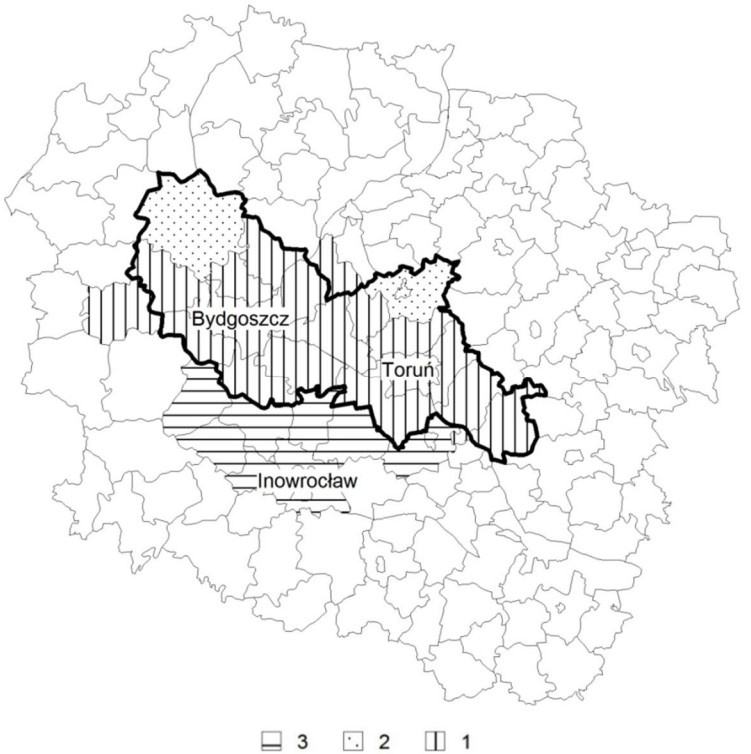
The re-defined metropolitan area (BipOM) slightly differs from the B-TOM. Two communes, Koronowo and Chełmża, have been excluded from its territory, while a few new communes, such as Ciechocinek, Nakło

[2] The type of a commune: (1) – urban commune, (2) – rural commune, (3) – urban-rural commune.

and Unisław, have been currently included. The BipOM takes regional space approximately 300 km$^2$ less than the B-TOM, while the number of inhabitants has remained very similar.

The results of the research also enabled identification of the Inowrocław district as a prospective candidate for the extension of the BipOM. Its communes demonstrate a high potential of regional development. Although including this area within the BipOM does not satisfy the maximum distance criterion, the Inowrocław district may significantly supply the economic situation of the BipOM.

**Figure 3.** Re-defined bipolar metropolitan area (BipOM) with the prospective area of its extension




1 – re-defined metropolitan area (BipOM) located within the Kujawsko-Pomorskie region,
2 – communes which have not satisfied all the criteria applying to metropolitan area, however nonetheless, were included within the original metropolitan area (B-TOM),
3 – the prospective area of extension of the BipOM.

The bold line identifies borders of the B-TOM according to the Concept of Spatial Development of the Kujawsko-Pomorski region.

Source: Authors' compilation.

## Conclusions

The main objective of the paper has been realized. The metropolitan area within the Kujawsko-Pomorski region was re-defined and its new borders – regarding present socio-economic situation in the region – were determined. The proposed metropolitan area – BipOM – slightly differs from the previous appointed B-TOM. However, the BipOM is represented by a set of communes in a way which satisfies all the criteria applying to contemporary metropolitan area. An attempt to indicate the prospective area of spatial extension of the BipOM was also made. The highest potential of regional development is demonstrated by communes located within the Inowrocław district (bordering on the BipOM) which may significantly supply the whole metropolitan area.

In the research, special attention was paid to considering significant socio-economic criteria defining regional development. Some difficulties, regarding a significant deficiency of relevant statistical data at the local level of territorial division (NUTS 5), have appeared. For that reason data regarding transport infrastructure, communication, and also commute was excluded from the investigation. Some aspects, which significantly affect regional development, e.g. assumptions of the economic policy of the state, were also ignored due to an empirical approach being taken in the research. Furthermore some qualitative aspects exceeding the scope of the research, and being difficult to measure and evaluate (such as experts', inhabitants' and local entrepreneurs' opinions), were excluded from the study.

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**Annex 1. Results of measurement**

| The name of commune* | Values of the synthetic measure in 2011 | Values of the dynamics measure | The level of regional development | | The dynamics of regional development | |
|---|---|---|---|---|---|---|
| | | | Rank | Class** | Rank | Class*** |
| Aleksandrów Kujawski (1) | 0.209 | 0.804 | 38 | III | 75 | II |
| Aleksandrów Kujawski (2) | 0.173 | 0.903 | 56 | III | 39 | III |
| Barcin (3) | 0.224 | 0.866 | 34 | IV | 53 | III |
| Bartniczka (2) | 0.087 | 0.482 | 132 | I | 144 | I |
| Baruchowo (2) | 0.083 | 0.500 | 134 | I | 143 | I |
| Bądkowo (2) | 0.148 | 0.656 | 75 | II | 127 | I |
| Białe Błota (2) | 0.405 | 0.714 | 5 | IV | 118 | I |
| Bobrowniki (2) | 0.111 | 0.584 | 112 | I | 140 | I |
| Bobrowo (2) | 0.121 | 0.699 | 100 | II | 120 | I |
| Boniewo (2) | 0.099 | 0.938 | 125 | I | 33 | IV |
| Brodnica (1) | 0.306 | 0.612 | 13 | IV | 133 | I |
| Brodnica (2) | 0.258 | 0.997 | 20 | IV | 21 | IV |
| Brześć Kujawski (3) | 0.208 | 0.852 | 39 | III | 56 | III |
| Brzozie (2) | 0.178 | 1.121 | 53 | III | 10 | IV |
| Brzuze (2) | 0.073 | 0.597 | 142 | I | 136 | I |
| Bukowiec (2) | 0.149 | 1.058 | 74 | II | 13 | IV |
| Bydgoszcz (1) | 0.410 | 0.808 | 4 | IV | 73 | II |
| Bytoń (2) | 0.126 | 1.295 | 96 | II | 3 | IV |
| Cekcyn (2) | 0.179 | 0.898 | 52 | III | 42 | III |
| Chełmno (1) | 0.269 | 0.796 | 19 | IV | 78 | II |
| Chełmno (2) | 0.133 | 0.988 | 90 | II | 22 | IV |
| Chełmża (1) | 0.228 | 0.742 | 31 | IV | 108 | II |
| Chełmża (2) | 0.142 | 0.920 | 84 | II | 34 | IV |
| Choceń (2) | 0.165 | 0.886 | 62 | III | 49 | III |
| Chodecz (3) | 0.150 | 0.886 | 71 | III | 47 | III |
| Chrostkowo (2) | 0.103 | 1.003 | 121 | I | 20 | IV |
| Ciechocin (2) | 0.061 | 0.596 | 144 | I | 137 | I |
| Ciechocinek (1) | 0.329 | 0.676 | 10 | IV | 123 | I |
| Czernikowo (2) | 0.154 | 1.061 | 68 | III | 12 | IV |
| Dąbrowa (2) | 0.104 | 0.834 | 120 | I | 63 | III |
| Dąbrowa Biskupia (2) | 0.099 | 1.014 | 122 | I | 19 | IV |
| Dąbrowa Chełmińska (2) | 0.256 | 0.695 | 22 | IV | 121 | I |
| Dębowa Łąka (2) | 0.120 | 1.217 | 101 | II | 7 | IV |
| Dobrcz (2) | 0.246 | 0.769 | 25 | IV | 93 | II |
| Dobre (2) | 0.099 | 1.055 | 123 | I | 14 | IV |
| Dobrzyń nad Wisłą (3) | 0.098 | 0.606 | 126 | I | 134 | I |
| Dragacz (2) | 0.203 | 0.730 | 42 | III | 115 | I |
| Drzycim (2) | 0.171 | 1.041 | 58 | III | 15 | IV |
| Fabianki (2) | 0.235 | 0.812 | 29 | IV | 71 | III |
| Gąsawa (2) | 0.159 | 0.646 | 66 | III | 129 | I |
| Gniewkowo (3) | 0.163 | 0.896 | 63 | III | 44 | III |

| The name of commune* | Values of the synthetic measure in 2011 | Values of the dynamics measure | The level of regional development | | The dynamics of regional development | |
|---|---|---|---|---|---|---|
| | | | Rank | Class** | Rank | Class*** |
| Golub-Dobrzyń (1) | 0.279 | 0.765 | 18 | IV | 96 | II |
| Golub-Dobrzyń (2) | 0.145 | 0.799 | 80 | II | 77 | II |
| Gostycyn (2) | 0.126 | 0.899 | 97 | II | 41 | III |
| Górzno (3) | 0.197 | 1.015 | 44 | III | 18 | IV |
| Grudziądz (1) | 0.294 | 0.767 | 15 | IV | 95 | II |
| Grudziądz (2) | 0.240 | 0.969 | 28 | IV | 25 | IV |
| Gruta (2) | 0.113 | 0.751 | 109 | I | 106 | II |
| Inowrocław (1) | 0.315 | 0.805 | 12 | IV | 74 | II |
| Inowrocław (2) | 0.194 | 0.815 | 47 | III | 70 | III |
| Izbica Kujawska (3) | 0.074 | 0.600 | 140 | I | 135 | I |
| Jabłonowo Pomorskie (3) | 0.130 | 0.789 | 93 | II | 82 | II |
| Janikowo (3) | 0.209 | 0.877 | 37 | III | 52 | III |
| Janowiec Wielkopolski(3) | 0.143 | 0.768 | 83 | II | 94 | II |
| Jeziora Wielkie (2) | 0.113 | 0.946 | 110 | I | 31 | IV |
| Jeżewo (2) | 0.172 | 0.902 | 57 | III | 40 | III |
| Kamień Krajeński (3) | 0.125 | 0.782 | 98 | II | 84 | II |
| Kcynia (3) | 0.108 | 0.635 | 116 | I | 130 | I |
| Kęsowo (2) | 0.192 | 1.025 | 49 | III | 17 | IV |
| Kijewo Królewskie (2) | 0.166 | 0.819 | 61 | III | 69 | III |
| Kikół (2) | 0.069 | 0.586 | 143 | I | 139 | I |
| Koneck (2) | 0.077 | 0.672 | 138 | I | 125 | I |
| Koronowo (3) | 0.184 | 0.791 | 51 | III | 81 | II |
| Kowal (1) | 0.318 | 0.986 | 11 | IV | 24 | IV |
| Kowal (2) | 0.110 | 1.386 | 114 | I | 2 | IV |
| Kowalewo Pomorskie (3) | 0.152 | 0.651 | 70 | III | 128 | I |
| Kruszwica (3) | 0.149 | 0.844 | 73 | II | 61 | III |
| Książki (2) | 0.074 | 0.623 | 141 | I | 132 | I |
| Lipno (1) | 0.204 | 0.773 | 41 | III | 91 | II |
| Lipno (2) | 0.080 | 0.794 | 135 | I | 80 | II |
| Lisewo (2) | 0.130 | 0.845 | 92 | II | 60 | III |
| Lniano (2) | 0.146 | 0.904 | 79 | II | 38 | III |
| Lubanie (2) | 0.147 | 0.753 | 76 | II | 102 | II |
| Lubicz (2) | 0.241 | 0.753 | 27 | IV | 103 | II |
| Lubień Kujawski (3) | 0.106 | 0.675 | 119 | I | 124 | I |
| Lubiewo (2) | 0.134 | 0.738 | 88 | II | 110 | I |
| Lubraniec (3) | 0.144 | 0.955 | 82 | II | 28 | IV |
| Łabiszyn (3) | 0.200 | 0.987 | 43 | III | 23 | IV |
| Łasin (3) | 0.133 | 0.847 | 91 | II | 59 | III |
| Łubianka (2) | 0.258 | 1.241 | 21 | IV | 5 | IV |
| Łysomice (2) | 0.298 | 0.808 | 14 | IV | 72 | III |
| Mogilno (3) | 0.212 | 0.781 | 35 | IV | 85 | II |
| Mrocza (3) | 0.158 | 0.842 | 67 | III | 62 | III |
| Nakło nad Notecią (3) | 0.224 | 0.887 | 33 | IV | 46 | III |

| The name of commune* | Values of the synthetic measure in 2011 | Values of the dynamics measure | The level of regional development | | The dynamics of regional development | |
|---|---|---|---|---|---|---|
| | | | Rank | Class** | Rank | Class*** |
| Nieszawa (1) | 0.186 | 0.824 | 50 | III | 67 | III |
| Nowa Wieś Wielka (2) | 0.360 | 0.795 | 8 | IV | 79 | II |
| Nowe (3) | 0.093 | 0.825 | 129 | I | 66 | III |
| Obrowo (2) | 0.243 | 0.704 | 26 | IV | 119 | I |
| Osie (2) | 0.195 | 0.964 | 46 | III | 26 | IV |
| Osiek (2) | 0.114 | 1.221 | 107 | II | 6 | IV |
| Osielsko (2) | 0.482 | 0.779 | 2 | IV | 87 | II |
| Osięciny (2) | 0.117 | 0.849 | 103 | II | 57 | III |
| Pakość (3) | 0.175 | 0.886 | 55 | III | 48 | III |
| Papowo Biskupie (2) | 0.116 | 0.772 | 104 | II | 92 | II |
| Piotrków Kujawski (3) | 0.163 | 0.917 | 64 | III | 36 | IV |
| Płużnica (2) | 0.149 | 0.853 | 72 | III | 55 | III |
| Pruszcz (2) | 0.146 | 0.737 | 77 | II | 111 | I |
| Raciążek (2) | 0.138 | 0.776 | 86 | II | 90 | II |
| Radomin (2) | 0.111 | 0.657 | 113 | I | 126 | I |
| Radziejów (1) | 0.246 | 0.739 | 24 | IV | 109 | I |
| Radziejów (2) | 0.092 | 0.827 | 130 | I | 65 | III |
| Radzyń Chełmiński (3) | 0.109 | 0.764 | 115 | I | 97 | II |
| Rogowo (2) | 0.134 | 0.688 | 89 | II | 122 | I |
| Rogowo (2) | 0.114 | 0.832 | 106 | II | 64 | III |
| Rogóźno (2) | 0.076 | 0.624 | 139 | I | 131 | I |
| Rojewo (2) | 0.139 | 0.751 | 85 | II | 105 | II |
| Rypin (1) | 0.358 | 1.026 | 9 | IV | 16 | IV |
| Rypin (2) | 0.078 | 1.133 | 136 | I | 9 | IV |
| Sadki (2) | 0.095 | 0.573 | 127 | I | 141 | I |
| Sępólno Krajeńskie (3) | 0.154 | 0.758 | 69 | III | 101 | II |
| Sicienko (2) | 0.254 | 0.735 | 23 | IV | 114 | I |
| Skępe (3) | 0.114 | 0.595 | 105 | II | 138 | I |
| Skrwilno (2) | 0.107 | 0.753 | 117 | I | 104 | II |
| Solec Kuj. (3) | 0.372 | 0.940 | 6 | IV | 32 | IV |
| Sośno (2) | 0.112 | 0.801 | 111 | I | 76 | II |
| Stolno (2) | 0.113 | 0.759 | 108 | II | 100 | II |
| Strzelno (3) | 0.146 | 0.952 | 78 | II | 30 | IV |
| Szubin (3) | 0.205 | 0.776 | 40 | III | 89 | II |
| Śliwice (2) | 0.162 | 1.062 | 65 | III | 11 | IV |
| Świecie (3) | 0.279 | 0.779 | 17 | IV | 86 | II |
| Świecie nad Osą (2) | 0.099 | 0.717 | 124 | I | 117 | I |
| Świedziebnia (2) | 0.106 | 1.268 | 118 | I | 4 | IV |
| Świekatowo (2) | 0.176 | 0.905 | 54 | III | 37 | III |
| Tłuchowo (2) | 0.121 | 0.761 | 99 | II | 99 | II |
| Topólka (2) | 0.094 | 0.779 | 128 | I | 88 | II |
| Toruń (1) | 0.524 | 0.890 | 1 | IV | 45 | III |
| Tuchola (3) | 0.227 | 0.823 | 32 | IV | 68 | III |

| The name of commune* | Values of the synthetic measure in 2011 | Values of the dynamics measure | The level of regional development | | The dynamics of regional development | |
|---|---|---|---|---|---|---|
| | | | Rank | Class** | Rank | Class*** |
| Unisław (2) | 0.211 | 0.959 | 36 | IV | 27 | IV |
| Waganiec (2) | 0.169 | 0.849 | 60 | III | 58 | III |
| Warlubie (2) | 0.135 | 0.897 | 87 | II | 43 | III |
| Wąbrzeźno (1) | 0.235 | 0.744 | 30 | IV | 107 | II |
| Wąbrzeźno (2) | 0.127 | 0.880 | 95 | II | 50 | III |
| Wąpielsk (2) | 0.084 | 1.880 | 133 | I | 1 | IV |
| Wielgie (2) | 0.128 | 0.953 | 94 | II | 29 | IV |
| Wielka Nieszawka (2) | 0.480 | 1.200 | 3 | IV | 8 | IV |
| Więcbork (3) | 0.118 | 0.729 | 102 | II | 116 | I |
| Włocławek (1) | 0.366 | 0.878 | 7 | IV | 51 | III |
| Włocławek (2) | 0.196 | 0.857 | 45 | III | 54 | III |
| Zakrzewo (2) | 0.090 | 0.569 | 131 | I | 142 | I |
| Zbiczno (2) | 0.144 | 0.784 | 81 | II | 83 | II |
| Zbójno (2) | 0.078 | 0.736 | 137 | I | 113 | I |
| Zławieś Wielka (2) | 0.287 | 0.918 | 16 | IV | 35 | IV |
| Złotniki Kujawskie (2) | 0.169 | 0.762 | 59 | III | 98 | II |
| Żnin (3) | 0.192 | 0.736 | 48 | III | 112 | I |

* The type of commune: (1) – urban commune, (2) – rural commune, (3) – urban-rural commune.
** The level of regional development: I – very weak, II – weak, III – moderate, IV – high development.
*** The dynamics of regional development: I – significant recourse, II – moderate recourse, III – slight recourse, IV – progress of regional development or relatively stable socio-economic situation.

Source: Authors' estimations.