

The potential catchment area of Polish regional airports

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Abstract. The aim of this paper is to determine the potential geographical catchment areas of Polish regional airports using isochrones of 1h and 2h road access to the airport. Moreover the article contains an overview of methods used to assess airports' potential catchment areas. An attempt to show the potential areas of overlapping marketing impact zones is also included.

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INTRODUCTION

The issue of airports' impact on local economy is very complex. On one hand it is assumed that airports are geographical monopolies which main goal is to maintain and adjust size of airfield and terminal infrastructure according to passenger and airlines demand. On the other hand airports' environment is getting more and more competitive. Airports - unlike other forms of inland transport - require intermodal means of transport to enable access for passengers and cargo. As developing intermodal infrastructure increasingly facilitates accessibility to the airport and new airports are being build, the catchment areas of regional airports start to overlap. Thus it seems essential for airports' managers to know how big are catchment areas of each airport and if they overlap potential market with other airports.

The dynamic development of the air transport market in Poland has a short history. Until the nineties of last century the sector was centralized which meant that almost 80% of all air operations were done from Fryderyk Chopin Airport in Warsaw. It was planned that the airport in Warsaw would be a transfer hub for the whole country, with regional airports having only auxiliary functions. Their main connections were flights to Warsaw airport. Passengers who wanted to fly further than to the capital, had to change. The regional airports usually had connections with other European hubs, such as Frankfurt, Munich or London, but their share in passenger traffic did not exceed 50%.

A substantial increase of passenger traffic and air operations took place after 2004, the year in which Poland joined the European Union and the provisions of the “open skies” agreements started to be enforced under Polish law. This increasing tendency was continued after Poland joined the Schengen zone in 2007. That meant the opening of national labour markets to the new member states (Rekowski, 2011). The dynamic increase of traffic was a consequence of the freedoms introduced in May 2004, which enabled the development of LCCs in Poland. The positive influence of “open skies” agreements could be noticed particularly at regional airports which had huge reserves of untapped capacity. These agreements contributed to an increase in revenues and airport management efficiency. This, in consequence, improved the financial situation of airports in the areas of both aeronautical and commercial activity (Olipra, 2009).

Two of the most important changes are the entrance of low fare carriers in a wide range of markets throughout the country and the reduction of market information asymmetries between airlines and consumers (Francis et al., 2004, Morrison, 2001). “Coupled with the general effects of deregulation, these developments have not only led to a general reduction in fare levels, but also to an increase in the ability of consumers to discriminate on a geographic level between and among fares and service levels, and correspondingly airports, for their air travel requirements.” (Fuellhart, 2007)

The goal of this article is to show the theoretical overlapping catchment areas of Polish airports after putting into service new road and airport infrastructure which were built in order to improve travel time between main cities in Poland before European Football Championship 2014. From a historical perspective it was the biggest development of this type of infrastructure in Poland. It was accomplished just in a few years period thanks to access to EU funds. Article contains a presentation of a few chosen methodologies used to define and construct airports catchment area. Additionally author describes a simple method to show the theoretical areas of competition between Polish airports that can be applied quickly and easily without advanced software and databases.

1. DEFINITION OF AIRPORT’S CATCHMENT AREA

Generally there is no exact definition of catchment area commonly adopted in the literature. The approaches differ depending on the author. Nevertheless it seems that the most common definition states that in general airport’s catchment area is the area surrounding the airport from which it attracts its passengers and cargo freight (Lieshout, 2012). According to Civil Aviation Authority (2011) the above mentioned definition could be expanded also to area that contain all destinations of inbound traffic.

Managers of Polish regional airports tend to simplify this definition and to perceive catchment area as a circular land area of 100 or 200 kilometres around the airport - according to a common practice of placing a map visualizing above mentioned circles on the airport’s webpage. An example is shown on Figure 1, which describes catchment area of Katowice Airport according to its operator. The above mentioned approach is simple to apply but completely ignores travel time to and from the airport and distribution of various means of transport and distribution of population.

Other common approach is catchment area understood as a geographical area of 1h or 2h travel time to and from the airport. There are also hybrid approaches of circular distance or travel time mixed with information received from survey polls. An example of application of this approach is catchment area published on official website of Warszawa-Modlin - a secondary low-cost oriented airport for Warsaw agglomeration. The map is presented on Figure 2. It presents not only 1h and 2h travel time by car, but also an area (dark blue colour) that according to airport authorities is not covered by any other airport and thus it can be accounted as extended catchment area. The hypothesis is supported by a survey carried out at the airport departure area.



Figure 1. Circular catchment area of Katowice Airport

Source: <http://www.katowice-airport.com/en/business/catchment-area>

This method takes into account distribution and quality of road transport but still represents only potential area of passengers’ destinations and origins. It does not include many other factors that influence passengers choice e.g. other means of transport (rail) or density of residence. Both methods should not be applied to big hub airports that serve intercontinental traffic as these are fed to a vast extend with transfer passengers that start their travel at distant regional airports.

An attempt to draw an empirical catchment area of an airport was prepared by Lieshout (2012). He noted that with the development of more and more regional airports, passengers have a wider choice of airports than ever before. This means that airport catchment areas increasingly overlap. As a result airports need to share the potential market in their catchment area with an increasing number of other airports. This means that catchment areas are not static, but evolve over time depending on relative changes in the service offerings of airports.

Real catchment area depends also on the type of passenger. It is supposed that business passengers tend to value their time more than recreational passengers. According to CAA study (CAA 2011) business passengers are not keen to spend more than an hour getting to and from airport. On the contrary two hour transport time is still acceptable for recreational passengers.



Figure 2. Catchment area of Warszawa-Modlin airports - a hybrid approach: isochrones supported by survey polls.

Source: <http://en.modlinairport.pl/mobile.php/catchment-area.html>

Other factors influencing the size of catchment area are (Jarach, 2005):

- Effective intermodal connections
- Offer of other nearby airports
- Substitutes (motorways, fast railways)
- Law and geographical obstacles (visas, islands, mountains etc.).

Lieshout (2012) have developed a methodology basing on neoclassical economics and assuming that a traveller chooses the travel alternative that maximizes his/her total utility or minimizes total disutility (e.g. costs). His model does not visualize general catchment area for an airport, but shows a catchment area for a specific destination served by particular airport in comparison to other nearby airports. He has chosen multiple factors that impact passengers decision on choosing an airport. Among others those are: access cost by car, airfares, market concentration and additional transfer time cost of alternative indirect flights. The example results for Amsterdam Airport Schiphol and its two destinations Malaga and Xiamen are presented on Figure 3.

It turned out that catchment area of an airport depends strongly on the type of air traffic it serves. The first factor is the popularity of destination. The catchment area is relatively small for popular destinations as passengers may choose other nearby airports to get there. Comparison of ticket price, standard of airline, flights timetable, airport infrastructure, and last but not least the distance to airport are the key issues for

passengers during the purchasing process. Airports serving less popular destinations tend to have bigger catchment areas as they became geographical monopolies for passengers. In this situation passengers are more likely to choose a more distant airport (Lieshout 2012). It can be seen in Figure 3. Malaga which is relatively a popular destination and thus offered by many nearby airports, have substantially smaller catchment area than Xiamen destination. The potential “Malaga” passenger could choose other nearby airport that offer for example better facilities or lower prices. The passenger flying to Xiamen didn’t have the same diversity of choice. Therefore, change of airport in this case would entail more disutilities (e.g. longer travel and cost time).

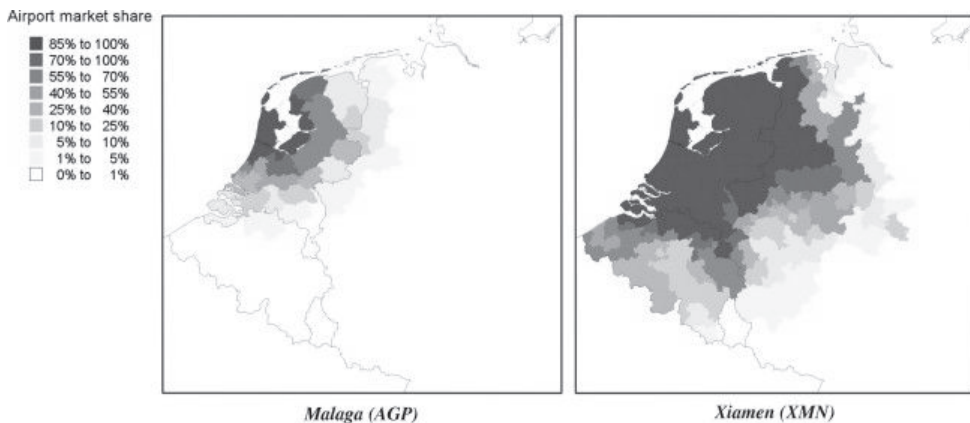


Figure 3. Catchment area for Amsterdam Airport Schiphol and its market shares therein for flights to Malaga and Xiamen, business passengers, 2011Source: Lieshout (2012)

The methodology seems very useful for airports managers, especially during process of establishing new network connections. Nevertheless the variables does not take into account other means of transport (e.g. rail). The tool is very complex and could describe general catchment area through the analysis of specific destinations which can change seasonally. Nevertheless the output data still is a theoretical area. An alternative to this approach could be a methodology based more on vast passenger survey polls which is recommended for further research.

The other worth mentioning group of methods are based on data mining. An example for Polish market was prepared by wpdata.pl. Figure 4 presents airports’ travel time access isochrones of 30, 60, 90, 120, 150 and 180 minutes. It can be see that the least competition is in northern regions. One can assume that the most comfortable situation has GDN airport due to the smallest overlap of its catchment area with other airports. It is hard to say which region is the most competitive as the map presents all the types of airports: hubs, regional and these that serves only one regular destination. This is the strongest disadvantage of both figures 4 and 5.

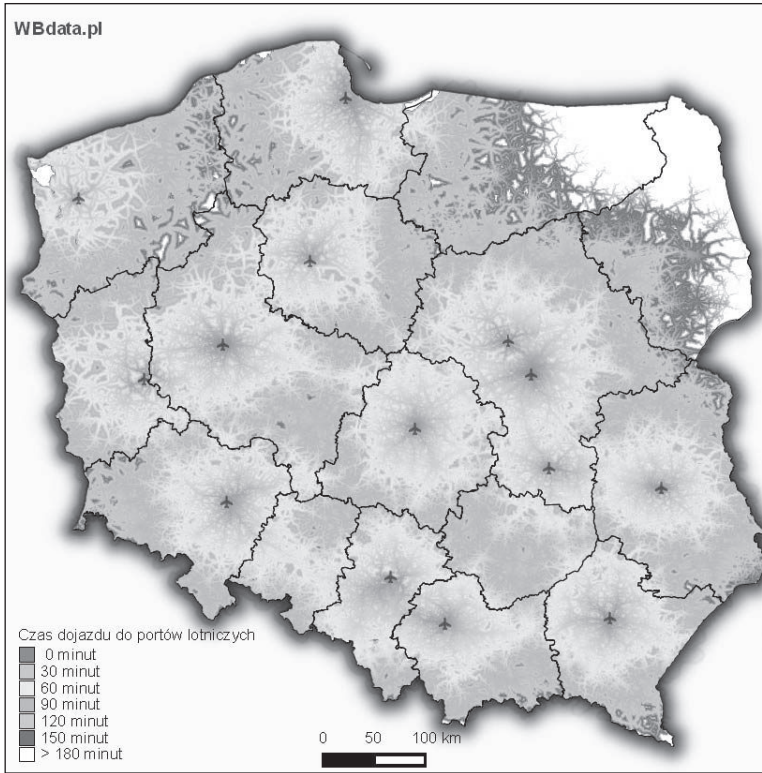


Figure 4. Catchment areas of Polish airports based on data mining

Source: wpdata.pl

Figure 5 presents theoretical areas within isochrones of 60 minutes travel access to Polish airports (light red) and the overlapping areas (dark red). Map seems very precise as it is based on Open Map data, but without additional comment it may lead to misunderstandings. An example is dark red area between POZ and IEG. In fact these airports do not compete as POZ serves nearly one and a half million passengers annually in 16 regular destinations while IEG has only one regular destination to WAW hub and serves less than 0.05 mln PAX. The same situation is between WAW and WMI. The first one is intercontinental hub, while the latter serves only short-haul low-cost passengers.

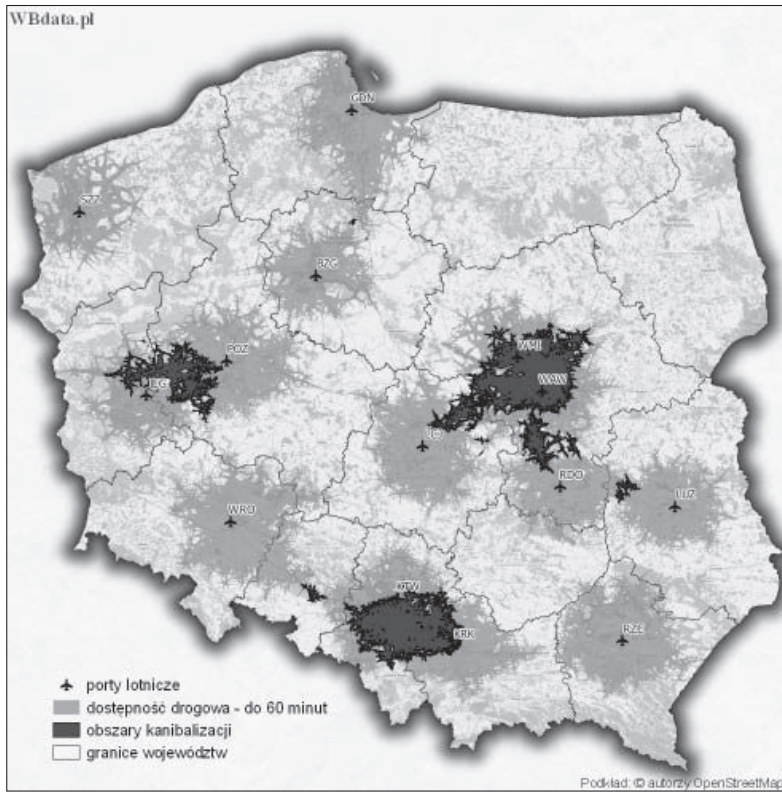


Figure 5. Catchment areas of Polish airports based on data mining

Source: wpdata.pl

2. POTENTIAL CATCHMENT AREA FOR POLISH REGIONAL AIRPORTS

This section contains an attempt to present catchment areas for Polish air transport market trying to avoid at least some of above mentioned models' disadvantages. Chosen methodology is very simple based on Google Maps and airports statistics is possible do apply quickly without access to advanced software or big databases. As stated before, the simple maps of circular distance or isochrones shouldn't be applied to hub airports as they serve transfer traffic. Therefore this section will be focused on Polish regional airports. The list in table 1 presents number of destinations in regular flights and passenger traffic in 2013. The only airport that could be concerned as hub for Polish air transport market is Warsaw F. Chopin Airport (WAW). Except WAW airport also the smallest airports will be omitted in the analysis as they offer very little number of destinations and serve a very little traffic. It is assumed that a passenger will not perceive an airport serving a few destinations as a real alternative to another nearby airport that serves direct flights to 15 or more places. Table 1 rows in bold represent regional airports that serve at least 15 destinations. It is worth to explain that WMI airport served only 0.3 mln passengers despite 26 destinations as it worked only for a few months in 2013 due to works related to renovation of runway.

Table 1

Number of regular destinations and passenger traffic in 2013

	Destinations	PAX [mln]
WAW	74	10.7
GDN	40	2.8
KRK	39	3.6
KTW	39	2.5
WMI	26	0.3
WRO	26	1.9
POZ	16	1.3
RZE	11	0.6
BZG	6	0.3
SZZ	6	0.3
LCJ	5	0.4
LUZ	5	0.2
IEG	1	0.0

Source: own compilation based on ulc.gov.pl

Figure 6 presents potential catchment areas for Polish regional airports that serve at least 15 destinations in regular flights. The airports with smaller number of connections are marked with gray icon. Map was prepared using Google Maps road distance tool with interval of 10km and travel time of 2 hours from each airport. The map ignores other means of transport for example train. Supplementary for the catchment areas map is Figure 7 presenting distribution of the population and density of residence in Poland.

It can be seen that the most competitive area in Polish air transport market is south central region of Upper Silesia. Potential passengers living between WRO, KTW and KRK have access in less than 2 hours travel to three regional airports. Map in Figure 7 indicates that Upper Silesia represents the highest density of residence in Poland. Therefore this most competitive market could be also the most promising provided that above mentioned airports could find their niches offering complementary services of mature air transport market.

Great example of such market division is London agglomeration where London City airport serves mainly business traffic, Heathrow is long-haul traffic hub, Gatwick medium-haul traffic and Luton and Stansted airports focus mainly on low cost carriers passengers. In fact KRK airport aspire to be a second hub for Poland, KTW focus on low cost carriers (over 70% of its traffic) charters and cargo while WRO balances out both low cost carriers and traditional traffic.

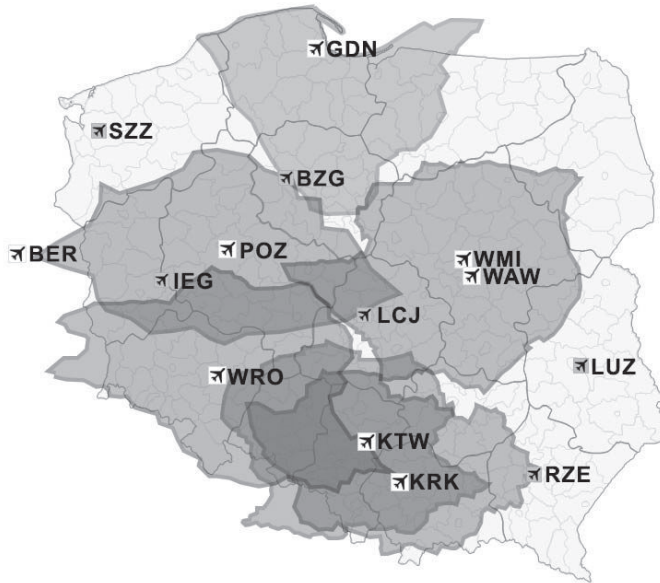


Figure 6. Potential catchment areas of regional Polish airports

Source: own elaboration

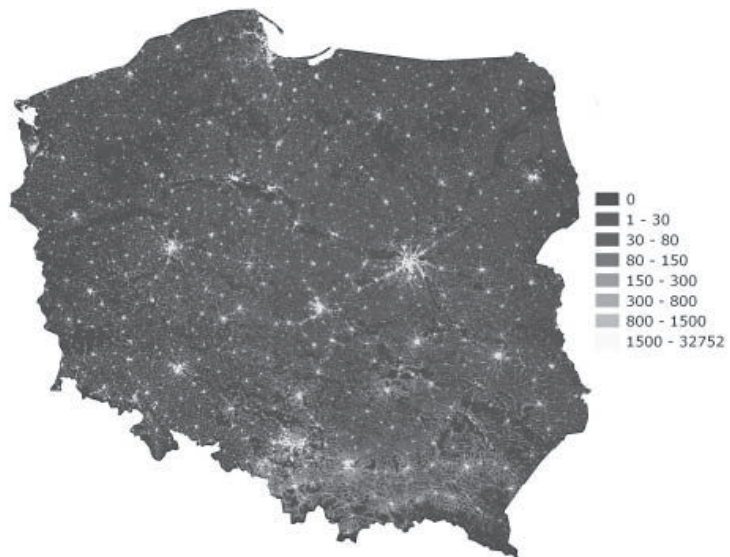


Figure 7. Density of the population in Poland 2011 (inhabitants/km²) \s

Source: compiled from <http://szyymcio.tumblr.com> and Eurostat: http://epp.eurostat.ec.europa.eu/portal/page/portal/gisco_Geographical_information_maps/geostat_project

Second region of most overlapping catchment areas is Central Poland. However, lower density of population makes this market less competitive. Strategies of airports indeed do not focus on any specific client. Both POZ and GDN balance out passenger share of traditional and low cost traffic as WRO does. The exception is WMI, which is the second airport for Warsaw and thus focus mainly on low cost traffic that does not operate at central WAW airport.

The least competitive air transport market is in northern part of Poland. GDN airport theoretically do not have any competitors nearby. Despite the fact that half of its potential catchment area covers Baltic Sea, the airport attracts passengers from areas more distant than 2h travel time. Survey polls proved that a huge part of passengers comes from northern east and northern west parts of the country where density of residence and business activity is too low to attract sufficient traffic for medium size airport (Huderek-Głapska 2011). This problem affects also the whole eastern part of Poland. Those areas cannot even benefit fully from potential passengers from Russia, Belarus and Ukraine as those countries are outside Schengen zone and their citizens require visas to EU.

The GDN airport does not have to apply any niche strategy as it attracts traffic from the whole northern part of Poland. It shares the blank areas with POZ and WMI, but inside 2 hour isochrones it can be perceived as local monopoly. It is partly supported by productivity and efficiency analysis in which GDN turned out to be the most effective both in financial and technical manner (Augustyniak 2014). On the other hand this is the least comfortable situation for passengers as do not have any other nearby airport to choose

CONCLUSION

Potential geographical catchment areas of Polish regional airports was presented in this paper. The map of 2h airport travel access isochrones was compared to a map presenting density of population. It seems that the most competitive air transport market in Poland is in southern regions where regional airports start to apply niche strategies in the likeness of mature markets. Competitiveness decreases in Central Poland, where catchment areas overlap very slightly. GDN the northernmost airport appears to be a monopoly for the most of northern part of the country. The methodology based on car access isochrones is relatively simple to apply but its minor point is its theoretical approach and ignoring other means of transport (e.g. rail). To obtain more empirical results a more profound survey poll analysis is recommended.

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