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Residents and Tourists as a Complementary Target Markets of Outdoor Event Organizes in Terms of Variable Weather Conditions. The Case of the Saint Dominic's Fair in Poland

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Abstract:

The development of technology, climate change as well as the cultural and social changes cause people to change their behavior, modify priorities and adapt to the new situation. Effectiveness and competitiveness, therefore, require up-to-date information on the market participants and factors affecting their behavior. As such, the aim of this article is to illustrate the impact of the weather conditions on participants' attendance at various urban outdoor events, crucial for a leisure market. The study presents the relationship between the number of residents and tourists visits at the St. Dominic's Fair in Gdańsk during individual days of the event and the weather conditions (temperature, precipitation, and sunlight intensity). As one of the data illustration methods, mobile phone-base-station logs were used to analyze consumer behavior. The study proved varying behavior of the residents and the tourists participating in the same event under different weather conditions emphasize these two diverse target markets' complementarities.

Keywords: leisure market; outdoor event; consumer behaviour; weather conditions; target market(s).

JEL Classification: D40; Z30.

Introduction

The leisure market is a market of products and services that make customers' spare time more attractive and diversified. Customers on this market are offered cultural services, biological regeneration, tourism, recreation, gastronomic, and entertainment services (Kolny 2013). It constitutes an important area of territorial marketing and a source of income for locally established enterprises, enabling the satisfaction of social needs as well as general human development. By consuming the services offered by this market, customers become familiar with new cultures, learn and cultivate local traditions, develop interests and, at the same time, engage in purchasing and thus impact the economy. What is more, along the socio-economic development, this market has been becoming increasingly competitive, as consumers these days are offered a growing number of alternative ways to spend their free time.

Simultaneously, the world has been experiencing climate changes, technical and technological progress has been underway and other processes have been taking place that may significantly affect changes in the behavior patterns on the market under examination. Studies, such as those presented in the further part of the study, are to help understand the processes taking place on this market and provide information enabling both the development of current competitive advantage and long-term strategic decision making. Cognition, as well as the monitoring, of the leisure market participants' behavior is therefore important, both from the perspective of enterprise management in this industry as well as the local governments and other stakeholders associated with this market.

Due to the fact that the demand satisfied in free time and the buyers' behavior are of high significance for the economy and individual enterprises, they have become the subject of numerous studies and analyses, both from the perspective of the sector (macro) and individual enterprises (micro) *e.g.* (Cox 2001, 227–286; Camp 2001, 127–135; Miller and Washington 2014, 1–314; Salanti, Malighetti, and Redondi 2012, 249–256; Miller and Washington 2017, 1–336; Rigas 2009, 396–401; Lloyd-Smith *et al.* 2019, 1–28; Hodgkinson, Hughes, and Hughes 2012, 1249–1269; Mumuni and Mansour 2014, 239–252; LeFebvre and Marktanner 2014, 831–848; Paramio and Zofío 2008, 638–717; Vázquez-Medina and Medina 2014, 28–35; Johnson 2013, 315–331; Sainz-González, Núnez-Sánchez, and Coto-Millán 2011, 12–20; Bieger and Laesser 2005, 19–25; Boksberger and von Bartenwerffer 2003, 12–20; Camarillo, Stodolska, and Shinew 2019, 50–66; Zhou *et al.* 2019, 565–581; Song and Wei 2018, 73–96).

Out of the many factors affecting human behavior during free time, weather is one worth paying attention to. The climate changes that we have been observing in recent years may significantly impact the shape of the lei-sure market, particularly in association with tourism and outdoor events (fairs, festivals, sports events, outdoor concerts, etc.). As Stefan Gössling, Daniel Scott, C. Michael Hall, Jean-Paul Ceron and Ghislain Dubois write, tourists exhibit the greatest adaptability among all the elements of the tourist system due to their flexibility in substituting the place, the time and the type of rest, even in very short time horizon. Consequently, comprehension of the changes in the tourists' behavior in response to the effects of climate change is necessary to predict the potential geographic and seasonal changes in the tourism demand (Gössling *et al.* 2012). This valuable observation, in fact, applies to all the leisure industry participants because they also have great possibilities of replacing the activities undertaken outside the home (*e.g.*, going to the movies) with the substitutes available without leaving home (VOD home rental). Even if fragmentary, such research can illustrate different but complementary participants' behaviors that can be significant in epistemological and in practical implications.

In connection with the climate changes being observed, an increasing number of studies have emerged in the context of its influence on the leisure market. Most often, studies concern conceptually separate parts of the market, as the tourism sector and the impact of the climate on it *e.g.*:(Agnew and Palutikof 2001, 41–50; Hamilton and Lau 2005, 229–250; Day *et al.* 2013, 51–56; Machete *et al.* 2015, 153–176; Gómez-Martín *et al.* 2020, 1–18; Wilkins *et al.* 2018, 1042–1053), as well as on sustainable development of tourism *e.g.*(Scott and Lemieux 2010, 146–183; Scott, Lemieux, and Malone 2011, 11–122; World Tourism Organization (UNWTO) and United Nations Environment Programme (UNEP) 2008; Farmer *et al.* 2011, 11–23; Gössling, Araña, and Aguiar-Quintana 2019, 273–283; Sumner and Mair 2017, 281–295; Kersulic, Peric, and Wise 2020, 1–18; Adamus-Matuszyńska *et al.* 2021, 1–17; Anciaux 2019, 1–19; Yao and Mallik 2020, 1–17).

Many authors have examined the impact of the weather conditions on the changes in the tourists' travel plans. Factors that have the greatest impact on the change of travel plans have been identified *e.g.:* (Zanni and Ryley 2015, 305–319; de Freitas 2003, 45–54; Ruggieri 2014, 371–383; Craig and Feng 2018, 351–361; Denstadli, Jacobsen, and Lohmann 2011, 920–940; Becken 2013, 156–157; Mckercher *et al.* 2015, 442–455; Becken and Wilson 2012). One field of research is the influence of the weather conditions on the number of participants at outdoor places *e.g.*:(Toubes, Araújo-Vila, and Fraiz-Brea 2020, 1–17; Gómez-Martín and Martínez Ibarra 2012, 135–145; Martínez-Ibarra *et al.* 2019, 1–14).

In reference literature, the leisure market can be considered in the broader context and explain the relationship between the weather conditions and recreational physical activities *e.g.:* (Spinney and Millward 2011, 135–145; Shih and Nicholls 2011, 315–382; Böcker *et al.* 2019, 491–505; Durand, Zhang, and Salvo 2017, 133–136; Liu, Susilo, and Termida 2020, 219–236; Elliott *et al.* 2019, 39–50; Berkhout and Brouwer 2005, 211–221; Førland *et al.* 2013, 567–579; Verbos, Altschuler, and Brownlee 2018, 533–556; Hewer and Gough 2017, 1–14). From the leisure market perspective, the attendance at outdoor leisure activates is also studied *e.g.:* (Perkins IV 2018, 127–137; Perkins IV and Debbage 2016, 44–61). However, in reference literature, only few studies take a closer look at the weather condition's impact on the participation at outdoor leisure market events that the authors

focus on in this specific study *e.g.:* (Daniel Scott and Jones 2007, 219–232; Jones, Scott, and Khaled 2006, 63–76; Fairley, Ruhanen, and Lovegrove 2015, 618–626; Walsh 2012, 131–134).

The studies presented in the international scientific discourse mainly concern research optimal to pursuing weather conditions tourism rather than the full spectrum of the leisure market services. There are relatively few publications about the influence of weather conditions on outdoor leisure events, moreover, they do not contain the complementarity of residents and tourists' behaviors, which could be vital in view of climate changes and anomaly like the SARS-CoV-2 pandemic. The content prepared by the authors is aimed to fulfill the research gap through the analysis of the impact of the weather conditions on the number of participants visits in both groups of people, as mentioned above in one of the biggest outdoor events of the leisure market in Poland. The aim of this paper is to illustrate the impact of weather conditions as temperature, precipitation, cloud coverage on the number and structure (residents and tourists) of participants visits at the urban outdoor event of the leisure market. The studies were conducted based on data, including the weather conditions and the attendance of participants in 2018-2019.

1. Literature Review

1.1. Outdoor Events on the Leisure Market – Term and Research Gap

The term leisure is relatively difficult to clearly define, as the perception of free time derives from cultural conditions, systems of value, religion, etc. (Cynarski 2017). In the course of the discussion on this concept, questions have been raised, *e.g.:* is time off from work due to illness a free time in certain situations? The scientific discourse that has been going on for decades has resulted in numerous publications on this concept (Neumeyer and Neumeyer 1958; Kaplan 1975; Kelly 2009; Veal 1992, 44–48). Views on the issue of free time had been expressed as early as the time of Aristotle, who claimed that leisure time is time that should be devoted to art, science and, above all, philosophy (Cynarski 2017). The complexity and ambiguity of the definition of free time is easily noticeable in English-language literature; three terms are used to describe free time: free time (Miłaszewicz and Węgrzyn 2020, 104–117; Kwilecki 2011, 7–14; Bojanowicz 2015, 132–143; Cordes 2013, 3). The researchers also point to the existence of two types of free time definitions: quantitative (the leisure time as the remaining time of working time) and qualitative (free time is explained as permission to do what one likes at one's own pace, to participate in the activity of one's choice and the possibility to give it up at) (Cordes 2013, 3; Mastrothanasis and Kladaki 2020, 10–19; Fisher and Robinson 2010; Davidovitch and Soen 2016, 492–511; Davidovitch and Druckman 2017, 452–466; Veal 2020, 89–113; Stebbins 2018, 255–264). Considering the multitude of the definitions of the concept of leisure in our further considerations, it has been assumed that leisure is the time after work remaining for household and social duties, which individuals can spend as they chose (Tribe 2004). It is the time spent on recreation, which can take various forms, from TV watching and book reading at home, to various types of activities outside the home, *i.e.* going to a movie or a theater performance, domestic and foreign travel, participation in various types of events, or visiting shopping centers, which, due to their numerous functions, are more than just places of essential shopping.

Activities undertaken in free time, referred to as recreation, generate the demand for various types of goods and services. To organize and spend free time, consumers buy movie or theater tickets, stream video content, purchase accommodation and catering services, buy sports equipment and etc. The significance of this area of the economy could be witnessed after the announcement of the Covid-19 pandemic, when the temporary lock-down caused numerous financial problems for individuals and bankruptcies, not only in the tourism industry.

Events are one group of the wide range of services of the leisure market. Moreover, in highly developed countries, events figure as a part of the national economy and are called meeting industry (Commission of the European Communities (CEC) & International Association of Professional Congress Organizers (IAPCO) 1992; Hildreth 1990; Polivka 1996; Goldblatt 2008; Allen 2010). Events take various forms and extend depending on participants' needs and goals. The literature of the subject provides a varied classification of events, for instance (Chlechowicz 2009, 9–89; Klimina 2015, 126–129): institutional events – social events, organized by official authorities, addressed to citizens, voters, and organizations (jubilees, symposiums, and others); business events - events aimed to improve communication within the internal structure, with suppliers, dealers, and other business partners; incentives events – organize to motivate employees and collaborators; special events – uncommon events that help to communicate with customers. On the other hand, the events practitioners provided division based on (Kasperska 2010, 347–358): (1) place - an attachment to a place, touring (used by radio stations), stationary; (2) time – one-day, multiday, phased; (3) repetitiveness – one-time, repeated, periodic; (4) reach - a few people, group, mass, global; (5) goal - public image, after-sales, non-profit, guerilla; (6)

interactions with audience - active, passive; (7) type and form of the event – musical, sport, recreational, fairs, festivals, film show, multimedia, picnic, banquet, performance, light and sound show, fireworks display, laser lighting display, martial arts, gala, games, happenings, kid's shows, etc.

In the context of the subject under discussion, important events are the ones organized by regional or local authorities, which relatively frequently approve the form of outdoor urban events as: celebration the day of the town, county fairs, feasts (Kalinowska-Żeleźnik 2014a, 51–61; Kalinowska-Żeleźnik 2014b, 135–147; Florek, Glinska, and Kowalewska 2009, 126). Such events often have centuries-old traditions and fulfill many functions. They enable the cultivation of these traditions, development of tourism and are popular attractions for local communities. Often, these events are essential elements stimulating the economic development of the hosting localities.

The authors indicate that so far in scientific discourse, the impact of weather conditions on attendance at widely understand outdoor activities of the leisure market *e.g.:* (Perkins IV 2018, 127–137; Perkins IV and Debbage 2016, 44–61) and on outdoor events of the leisure market have not been examined closely *e.g.*: (Jones, Scott, and Khaled 2006, 63–76; Fairley, Ruhanen, and Lovegrove 2015, 618–626; Walsh 2012, 131–134). Moreover, the authors pointed out the lack of empirical studies that consider the classification of the participants of an event on local and non-local consumers. Attendees' classification is performed but in studies not connected with the weather *e.g.*: (Lyu and Lee 2013, 186–200). Furthermore, the geographical distribution of the studies about the impact of the weather conditions on the participants at outdoor events of the leisure market is unsymmetrical – the overwhelming majority focus on North American leisure markets (Daniel Scott and Jones 2007, 219–232; Jones, Scott, and Khaled 2006, 63–76; Fairley, Ruhanen, and Lovegrove 2015, 618–626; Walsh 2012, 131–134) and other markets are definitely less identified.

1.2. The St. Dominic's Fair in Gdańsk

The analysis of the impact of the weather on the number of the guests visiting outdoor city events was carried out on the example of one of the largest and the oldest cultural, entertainment and commercial events organized in Poland - the St. Dominic's Fair in Gdańsk. This event is organized annually, at the turn of July and August and, most importantly, it lasts three weeks. This duration allowed observation of many different weather conditions and comparison of the data for two consecutive years. Moreover, the St. Dominic's Fair hosts a wide variety of guests, who are both the residents of Gdańsk and the metropolis as well as domestic and foreign tourists (http://jarmarkdominika.pl/en/; accessed on 1 December 2020).

St. Dominic's Fair tradition started back in 1260 when it was established by Pope Aleksander IV, who authorized Dominicans from Gdańsk for giving indulgences. One of the oldest descriptions of the fair came from the XVI century and was written by Giulio Ruggieri: In August the great St. Dominic's Fair takes place, gathering visitors from Germany, France, Fleming, England, Spain, Portuguese, ships come into port, 400 ships full of French and Spanish wine, silk, olive oil, lemons, confitures, and others Spanish produce, Portuguese roots, English tin, and baize. In the Fair participated also circus performers, jugglers, acrobats and theatre groups. Various strange creatures were presented, exotic animals or even sirens(http://jarmarkdominika.pl/en/).

The St. Dominic's Fair is important for the economy of the city and the region. In 2019, it was visited by over two million guests, who spent around 150 million Euro (data from the Professor BrunonSynak Pomeranian Research Institute in Gdańsk, Poland). The money went to the artists and craftsmen exhibiting their products at the Fair, the hotel, guesthouse, restaurant and eatery owners, and many others. The Fair is an important tourist attraction in Gdańsk. The surveys conducted in recent years among the Fair guests show that about 40% of the tourists visiting the Fair come to Gdańsk at the turn of July and August precisely because of this event.

Regardless of the event's high popularity, it should be noted that the number of visitors differed every day, which results from various factors, for instance the weather.

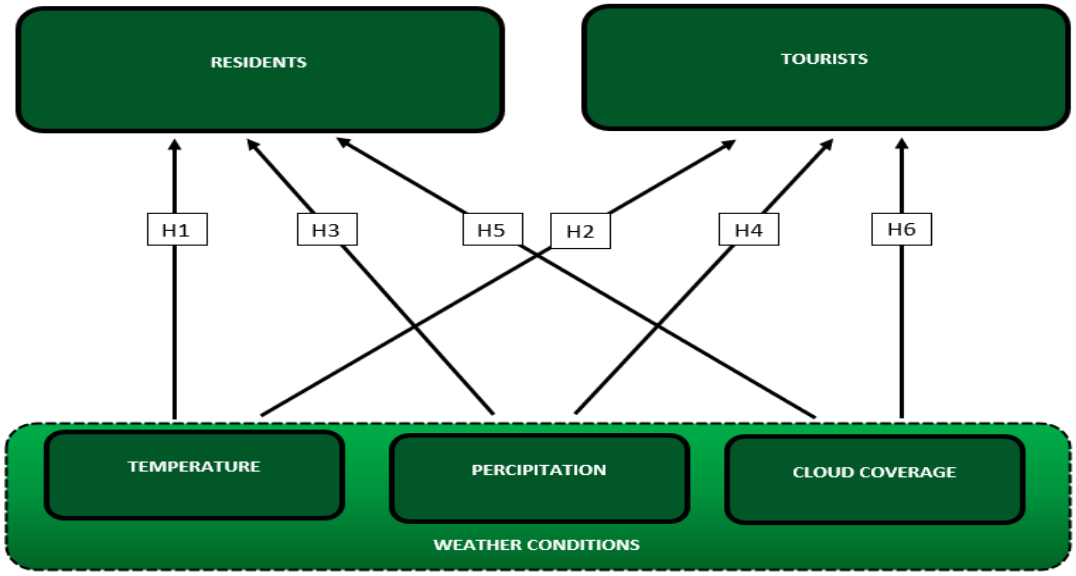
2. Methodology

2.1. Research Model and Hypotheses

The few previous research on weather conditions influences on participants' behaviours at the leisure time market indicated the relationship between the specific weather conditions and customers' behaviors. However, aforementioned studies focused on the tourist segment. In contrast, the authors of this paper concentrate on two separate groups of participants of St. Dominic's Fair: residents of the city (metropolis) where the event takes place and tourists who are visiting the city during the fair.

The research question stated in the empirical study was: "Are the weather conditions like temperature, precipitation, cloud coverage influence the number of local (hereinafter called residents) and non-local (hereinafter called tourists) participants at outdoor leisure time market events?' The purpose of this study was to examine the connection between the number of residents and tourists visits at St. Dominic's Fair in Gdańsk (Poland) and suggested weather conditions - temperature, precipitation, overcast. The following model (Figure 1) has been used as research framework.

Figure 1. Research Model.



The existing research's key findings state the relationship between weather condition like temperature and the attendance in pursuing openair tourism *e.g.:* (Gómez-Martín and Martínez Ibarra 2012, 135–145; Martínez-Ibarra *et al.* 2019, 1–14). This relationship was examined in the broader context of the leisure market services *e.g.:* (Shih and Nicholls 2011, 315–328; Böcker *et al.* 2019, 461–505; Durand, Zhang, and Salvo 2017, 133–136; Liu, Susilo, and Termida 2020, 219–236; Elliott *et al.* 2019, 39–50; Berkhout and Brouwer 2005, 211–221; Førland *et al.* 2013, 567–579; Hewer and Gough 2017, 1–14; Perkins IV and Debbage 2016, 44–61), particularly in the case of outdoor events of the leisure market. According to the aforementioned research gap, the authors decided to study if the weather condition affects local and non-local participants of outdoor events at the same level.

H1: *There is a relationship between the weather factor, which is the temperature, and the number of residents visits at the outdoor event of the leisure time market.*

H2: *There is a relationship between the weather factor, which is the temperature, and the number of tourists visits at the outdoor event of the leisure time market.*

The authors also examined the possibility of the relationship between the weather factor, which is the precipitation, and participation at outdoor events of the leisure time market (Shih and Nicholls 2011, 315–328; Böcker *et al.* 2019, 491–505; Durand, Zhang, and Salvo 2017, 133–136; Førland *et al.* 2013, 567–579; Hewer and Gough 2017, 1–14; Perkins IV 2018, 127–137; Perkins IV and Debbage 2016, 44–61),specifically regarding outdoor leisure market events (Daniel Scott and Jones 2007, 219–232; Jones, Scott, and Khaled 2006, 63–76; Fairley, Ruhanen, and Lovegrove 2015, 618–626). The mentioned above relationship was studied in two customer segments: local and non-local.

H3: *There is a relationship between the weather factor, which is the precipitation, and the number of residents visits at the outdoor event of the leisure time market.*

H4: *There is a relationship between the weather factor, which is the precipitation, and the number of tourists visits at the outdoor event of the leisure time market.*

Literature query allowed for identifying studies examined the connection between another weather factor, cloud coverage, and participants at outdoor the leisure market services. Above mentioned research considered this linkage as: cloud cover (Perkins IV and Debbage 2016, 44–61) or quite the opposite, for instance as: daylights (Elliott *et al.* 2019, 39–50), clear sky (Førland *et al.* 2013, 567–579), hours of sunshine (Berkhout and

Brouwer 2005, 211–221). The authors of this publication proposed a slightly different approach and examined the cloud coverage' impact on participation at outdoor leisure market events by local and non-local customers.

H5: *There is a relationship between the weather factor, which is the cloud coverage, and the number of residents visits at the outdoor event of the leisure time market.*

H6: *There is a relationship between the weather factor, which is the cloud coverage, and the number of tourists visits at the outdoor event of the leisure time market.*

2.2. Research Method

The study described further in this work is exploratory in nature. Initially, the relation between the weather and the total number of Fair visitors was analyzed. This, however, did not provide any constructive conclusions, thus the visitors were divided into two groups – local and non-local visitors. It was assumed that the locals were the residents of the Gdańsk-Gdynia-Sopot Metropolitan Area (the area includes the following districts: Pucki, Wejherowski, Lęborski, Kartuski, Gdański, Nowodworski, Tczewski, and Malborski). The non-residents, on the other hand, were other visitors, a large part of whom came to Gdańsk for tourist purposes and stayed overnight in accommodation facilities within the metropolitan area. During the course of the study, this division was expanded - the event participants were grouped into three categories – residents of Gdańsk, local residents from outside Gdańsk, and non-residents. It turned out, however, that the residents of Gdańsk and the metropolis residents exhibit similar behavior. As such, the following analysis concerns a division into two groups of visitors: tourists and residents.

The data on the number of the Fair attendees' visits was estimated based of the number of cell phone logins in the zone during the Fair (data purchased from one of the mobile phone operators). Data on mobile phone base station logins, obtained from one of the mobile phone operators, was used to determine attendance in above mentioned event, being resident or tourist, the frequency and the duration of individual subjects' Fair attendance as well as to indicate their origin (city/town in which a given subscriber's phone logged in during nighttime).

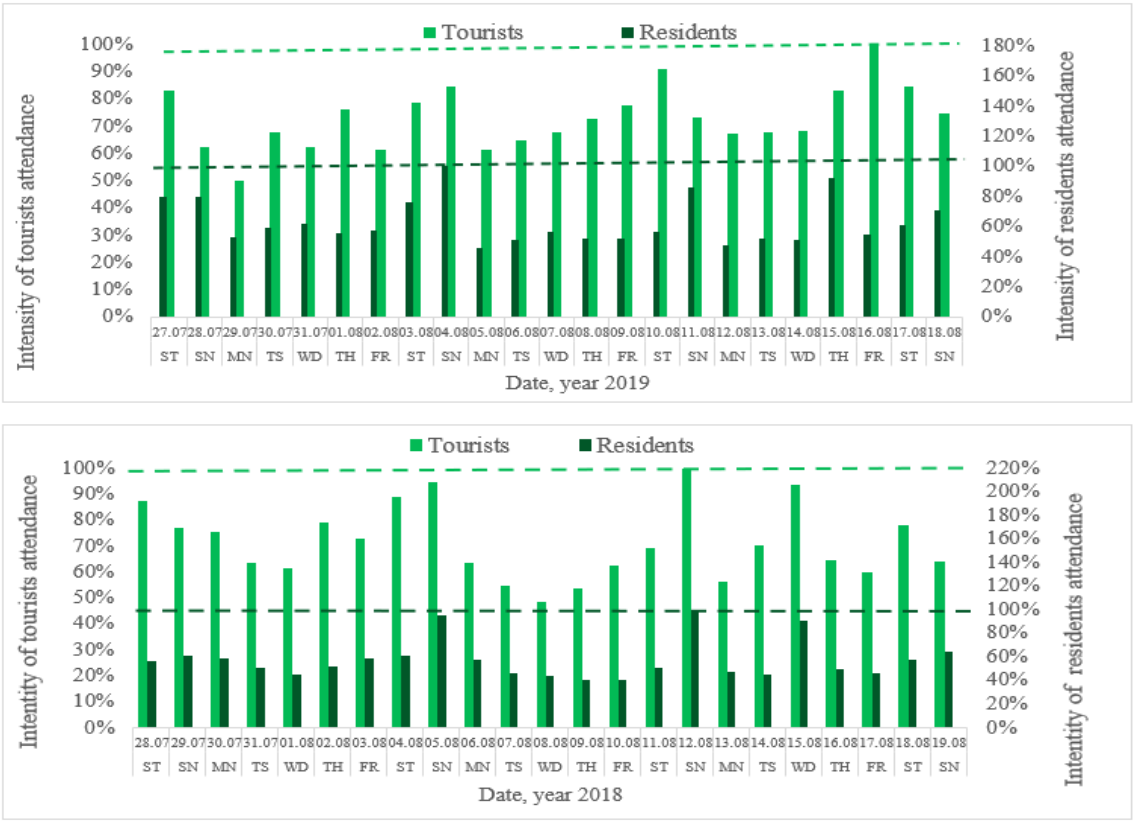
The data on the weather conditions in Gdańsk were taken from weather forecast websites, including the time frame of the study: 2018-2019, (https://www.ekologia.pl/pogoda/polska/pomorskie/gdansk/archiwum,zakres,28-07-2019_18-08-2019,31;https://pogoda.wp.pl/archiwum-pogody/gdansk/3099434/2019-07-27?fbclid=IwAR1UGp980VZHluTpcc1e1VE29t-9xkgYahfUsy4jlbnNHHDJV6OAldfhTeo; accessed on 1 December 2020), both daily and hourly data showing the weather conditions at 8 a.m., 12 p.m. and 3 p.m. It was assumed that the Fair visitors make up their mind to participate in the event several dozen minutes before going to or arriving at the venue, hence the three reference points (hours). The data on the number of the Fair attendees' visits was estimated based of the number of cell phone logins in the zone during the Fair (data purchased from one of the mobile phone operators). In order to exclude the people working and living in the area of the Fair, the number of subscribers whose phones permanently log into the cellular network in the area covered by the research was not considered in the analysis. To observe the attendance variability at particular times of the day, the Fair attendance data was collected and aggregated into three-time frames: 9:30 a.m. -12:59 p.m., 1 p.m. -4:29 p.m., 4:30 p.m. – 8 p.m.

3. Data Analysis

3.1. Attendance during St. Dominic's Fair

Analyzing the data presented in Figure 2, the fact that in Poland August 15 is a day off (the Feast of the Assumption of the Blessed Virgin Mary and the Armed Forces Day) and thus many Poles took a vacation day around that day for an opportunity of relaxing a few days during the so-called long weekend, should be taken into account. It should also be added that weekend attendance was influenced by the arrival of one-day visitors from outside the metropolis. Connectivity-wise, Gdańsk is well linked with other cities in northern Poland, both via the A1 motorway or the S7 expressway and by the railway system. As such, the volatility of attendance at weekends and on other weekdays suggested that further analyses should be conducted separately for these parts of the week.

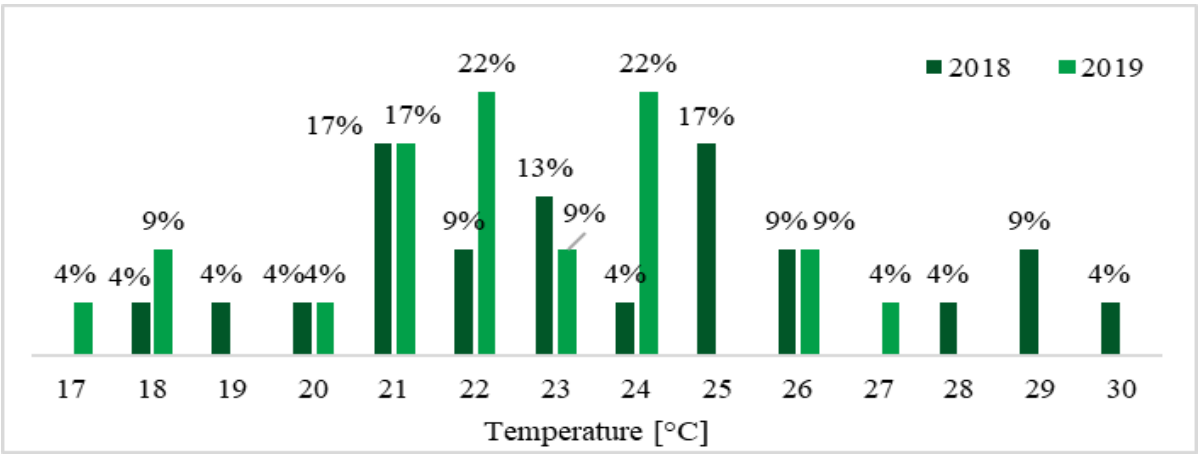
Figure 2. Residents and tourists Fair visitor intensity index for individual weekdays (2019, 2018).



3.2. The Weather Conditions during the St. Dominic's Fair in the years 2018 and 2019

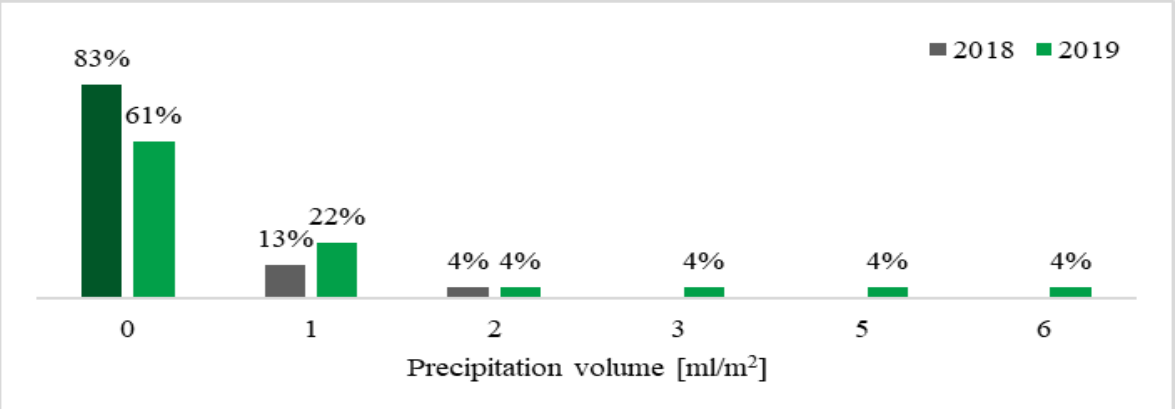
The first step was to check the weather conditions during the St. Dominic's Fair, both for 2019 and 2018 (see Fig. 3). The analysis shows that the weather conditions during the Fair were diversified. In 2019, the temperature varied between 17°C and 27°C, with most common values at 22°C or 24°C. In 2018, in turn, the average temperature was higher than in 2019, *i.e.* 24°C (in 2019 it was 22°C). The minimum temperature was 18°C and the maximum was as high as 30°C. Most often, however, the temperature was 21°C or 25°C.

Figure 3. Percentage of days with given temperature values, years 2018-2019.



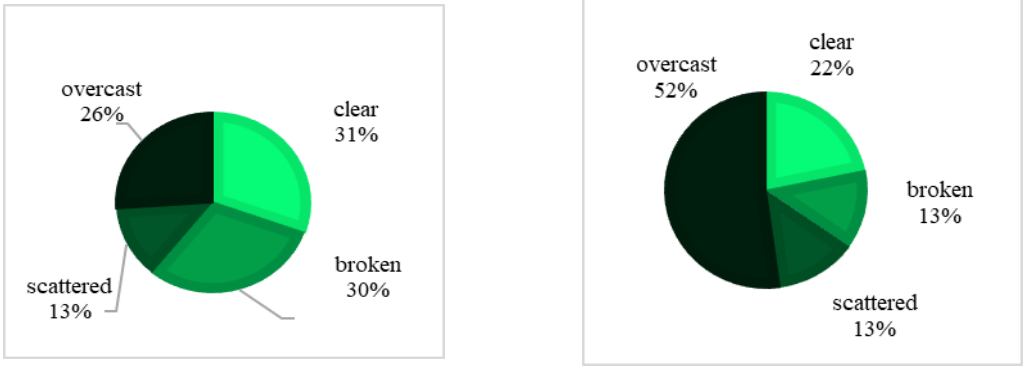
With regard to precipitation, in 2018, it rained much less frequently than in 2019 (see Fig. 4). In 2018, there rainless days accounted for 83% of the Fair duration, much more than in 2019, with only 61% of rainless days during the Fair. When it rained, precipitation most often reached 1 ml per m2. In 2018, during the Fair, it rained much rarer than in 2019 (see Fig. 4), *i.e.* 83% of rainy days in 2018, which is much more than in 2019, with only 63%. If it rained, most often the precipitation was 1 ml per m2.

Figure 4. Percentage of days with given precipitation values, years 2018-2019.



Subsequently, the degree of cloud coverage on the days of the Fair was checked. In 2018, there were more clear days (31%) than in 2019 (22%). In 2019, out of the three weeks of the Fair duration, more than half the time (52%) full cloud coverage was observed (see Figure 5).

Figure 5. (a) Cloud coverage percentage, 2018; (b) Cloud coverage percentage, 2019.



(a) (b)

The above presented data shows that the weather conditions in the periods compared differed, which may have affected subjective assessment of the weather on particular days of each year.

3.3. Analysis of the Relationship between Temperature and Fair Attendance

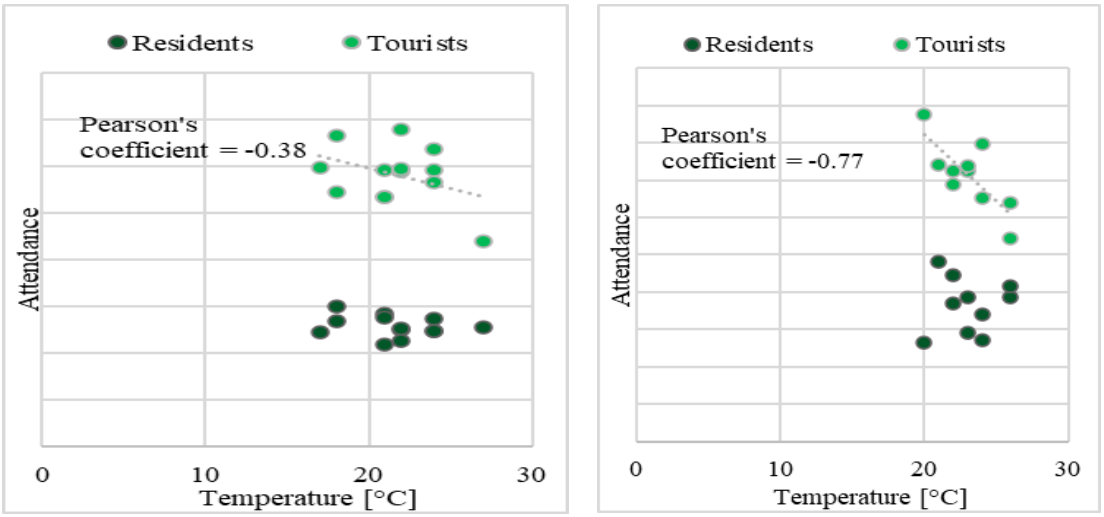
After analyzing the weather conditions during the Fair, the next step was to check whether a relationship existed between the temperature and the Fair attendance. For this purpose, the distribution of the attendance number was graphed against the temperature values. As mentioned above, the analysis was performed separately for the number of the residents and tourists visits to the Fair, both with regard to working days and weekends/holidays. Looking at Figure 6 it can be noted that with regard to the residents, there is no significant relationship between the temperature and the Fair attendance. In the case of the non-residents, a trend emerges which is especially visible during weekends/holidays. Interestingly, the higher the temperature, the smaller the number of non-residents at the Fair. The Pearson's correlation coefficient for weekends/holidays is -0.77, which signifies a quite strong correlation.

To confirm the above conclusions, a complementary analysis was carried out for the 2018 data. Based on the data illustrated in the scatter plots (Figure 7), it can be concluded that the temperature did not affect the attendance of residents in this period. As for the attendance of non-resident guests, a certain relationship was noted temperature-wise with regard to working days, where the Pearson correlation coefficient was -0.43.

An interesting observation, however, was made when analyzing the weekend and the non-working days data. The Pearson's coefficient was -0.13, which did not allow the thesis about the relationship between the temperature and the number of non-resident visits to be confirmed. The researchers' attention was drawn, however, to the value recorded for the temperature of 18 °C. This value has been marked in a darker color on Figure 7 (b). Knowing that the Pearson's coefficient is not immune to outliers, this observation was removed. After it had been removed, the correlation coefficient amounted to -0.59, which allowed a conclusion that this

year (2018), an inversely proportional relationship between the temperature and the weekends/holidays Fair attendance of non-residents could be observed.

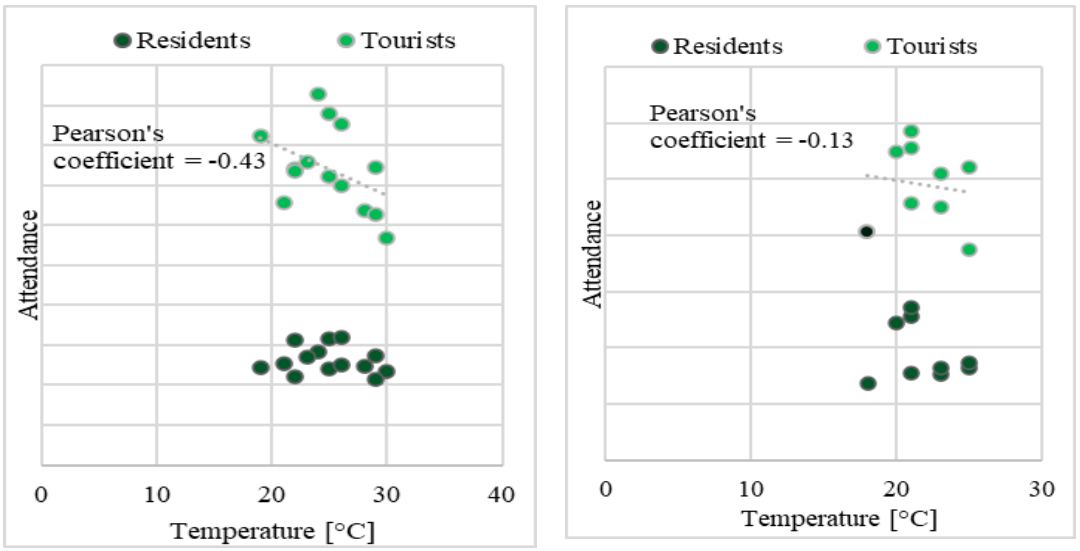
Figure 6. (a) Relationship between temperature and Fair attendance on a working day, 2019; (b)



(**a**) (**b**)

Relationship between temperature and Fair attendance during weekends/holiday, 2019.

Figure 7. (a) Relationship between temperature and Fair attendance on a working day, 2018; (b) Relationship between temperature and Fair attendance during weekends/holiday, 2018.



(**a**) (**b**)

In the light of the above analyses, it can be concluded that the resident's population's behavior is different than that of the tourists and daily visitors. What is more, the trends can only be observed within a certain temperature range. Following the research cited in the first part of the work, it can be assumed that high temperatures and clear cloud coverage are conducive to waterside leisure activity. Taking into account the fact that Gdańsk is situated by the sea and is surrounded by the many lakes of the Kashubian Lake District, the possibility of spending time on the beach or by a lake can constitute a competitive form of recreation, as opposed to visiting the St. Dominic's Fair. This aspect will be the subject of future research.

Air temperature is one of the variables affecting people's leisure time behavior. As such, in the course of further analyses, precipitation was also taken into account. And so, analyzing only the non-rainy days, an inversely proportional relationship can be observed in the segment of non-residents, between the Fair attendance variable and the temperature. This relationship is stronger on weekends/holidays and can be observed for both 2019 (Pearson's correlation = -0.82) and 2018 (Pearson's correlation = -0.58). It is noteworthy that, considering the rainless days alone, a relationship that had not been observed before emerged - the higher the temperature

on rainless days, the lower the Fair attendance of the residents (in 2019 on working days, and in 2018 on weekends/holidays). The results presented in Table 1, however, should be interpreted with some reservation, as the number of rainless days is not high and thus the results obtained may be of random nature.

In order to deepen the analysis, the relationship between the temperature and the Fair attendance at particular times of the day was examined: 8:30 a.m. -12:59 p.m., 1:00 p.m. -4:29 p.m., 4:30 p.m. -8:00 p.m.

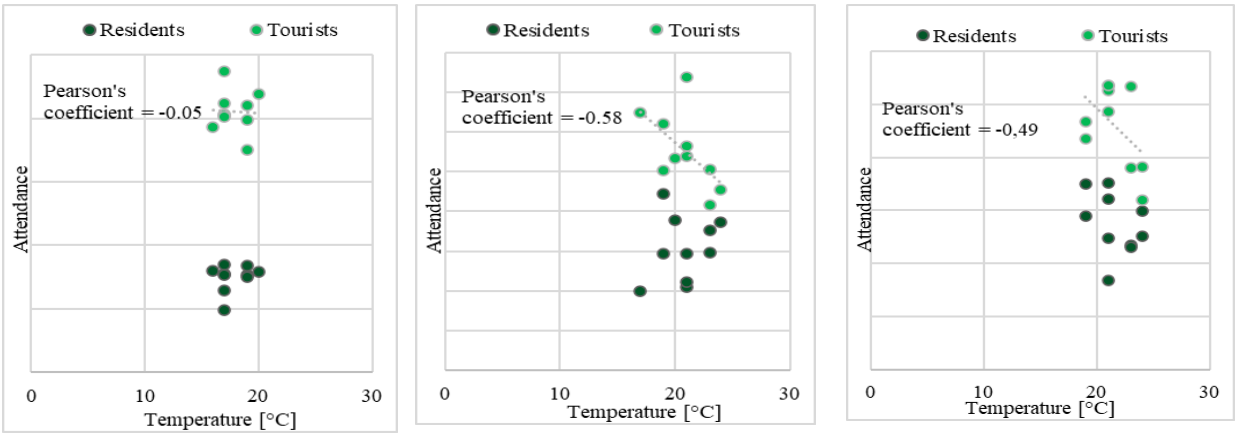
Table 1. Pearson's correlation coefficient between Fair attendance on rainless days and the temperature

	2019		2018	
	working day	weekend/ holiday	working day	weekend/ holiday
Residents	-0.68	-0.31	-0.26	-0.63
Tourists	-0.29	-0.82	-0.37	-0.58

Source: Own elaboration based on data analysis

Figure 8 shows the relationship for 2019 weekends, when the Pearson coefficient was the highest. Based on the graphs and the correlation coefficients calculated, it can be concluded that a relationship between the temperature and the Fair attendance of non-residents can only be observed for the time interval of 1 p.m. - 8 p.m., with a peak between 1 p.m. and 4:29 p.m.

Figure 8. (a) Relationship between temperature and 2019 weekend/holiday Fair attendance (8:30 a.m. - 12:59 p.m.); (b) Relationship between temperature and 2019 weekend/holiday Fair attendance (1:00 p.m. - 4:29 p.m.); (c) Relationship between temperature and 2019 weekend/holidays Fair attendance (4:30 p.m – 8:00 p.m.).



3.4. Analysis of the Relationship between Precipitation and Fair Attendance

The next step of the analysis entailed examination of the relationship between precipitation and Fair attendance. For this purpose, the median of the number of visits on rainy and non-rainy days was counted and the results obtained were compared. The results are presented in Table 2. The results, however, need to be interpreted carefully, because in 2018 there were only two rainy working days and two rainy weekend days.

With regard to the inhabitants of the agglomeration, more people visited the Fair on non-rainy days than on rainy days, especially on weekends and holidays (see Table 2). Taking into account the non-residents, however, generally more people visited the Fair on rainy days than on non-rainy days. In order to check whether statistically significant differences existed between the number of Fair visits on rainy and rainless days, the equivalent of the Student's t-test for independent samples was used the Mann-Whitney U test, since the groups under examination were not equal in quantity. The results of this test are as follows: the null hypothesis has been rejected in favor of an alternative, only in the case of the number of the residents working-day visits to the St. Dominic's Fair in 2019 (p-value = 0.019). As such, a difference exists between the number of the residents working-day Fair visits in 2019 on rainy days with and on non-rainy days ($\alpha = 0.05$). In other cases, there are no grounds for rejection of the null hypothesis.

To deepen once more the analysis, the median of Fair attendance on rainy and non-rainy days in 2019, at different times of the day, was calculated (see Table 3). Also in this case, the results should be interpreted with some reservations, as in certain cases, low percentage of rainy days has been observed.

Table 2. The ratio between the medians for Fair attendance on rainy days and for non-rainy days.

	2019		2018	
	working day	weekend/ holiday	working day	weekend/ holiday
percentage of rainy days	38%	40%	14%	22%
Residents	93%	84%	93%	86%
Tourists	100%	108%	105%	82%

Source: Own elaboration based on data analysis

The higher attendance of residents on non-rainy days, as opposed to rainy days, has been observed between 1:00 p.m. - 8:00 p.m. The higher attendance of non-residents on rainy days, compared to non-rainy days, has been mainly observed between 1:00 p.m. and 8:00 p.m.

Table 3. The ratio between the medians calculated for Fair attendance on rainy days and on non-rainy days, at different times of the day (2019).

	2019			2018		
	09:30 a.m. - 12:59 p.m.	1:00 p.m. - 4:29 p.m.	4:30 p.m. - 8:00 p.m.	09:30 a.m. - 12:59 p.m.	1:00 p.m. - 4:29 p.m.	4:30 p.m. -8:00 p.m.
percentage of rainy days	8%	31%	62%	20%	10%	50%
Residents	109%	97%	91%	104%	67%	83%
Tourists	118%	105%	100%	91%	122%	123%

Source: Own elaboration based on data analysis

3.5. Analysis of the Relationship between the Level of Cloud Coverage and the Fair Attendance

The next variable describing the weather conditions was the cloud cover. It is a four-level ordinal variable where: (1) signified a sunny weather (clear cloud coverage); (2) moderate cloudiness (scattered cloud coverage); (3) severe cloudiness (broken cloud coverage); and (4) - total cloud cover (overcast). In order to estimate the relationship between the cloud coverage (ordinal variable) and Fair attendance (quantitative variable), the Spearman's correlation coefficient was calculated. As in the case of the precipitation variable, the attendance medians were calculated and compared, leading to the same conclusions. In addition to the Spearman's correlation coefficient, the Kendall's Tau coefficient was also calculated, but the values assumed were similar to those calculated for the Spearman's coefficient.

Based on the results presented in Table 4, it can be concluded that the higher the cloud coverage, the lower the residents' Fair attendance both on working days and weekends/holidays, but only in 2019. In 2018, such relationship was not visible, which may have resulted from the small number of rainy days during the Fair, despite the cloud coverage.

Table 4. The Spearman's correlation coefficient between Fair attendance and the cloud coverage

	2019		2018	
	working day	weekend/ holiday	working day	weekend/ holiday
Residents	-0.66	-0.67	-0.03	0.34
Tourists	0.07	0.27	0.29	-0.18

Source: Own elaboration based on data analysis

Discussion and Conclusions

A more in-depth analysis of the data indicated the impact of the weather conditions on customers behavior similar to other publications (Scott and Jones 2007, 219–232; Jones, Scott, and Khaled 2006, 63–76; Fairley, Ruhanen, and Lovegrove 2015, 618–626; Walsh 2012, 131–134), in particular on attendance at outdoor leisure time market events (Perkins IV 2018, 127–137; Perkins IV and Debbage 2016, 44–61). However, the relevance of the individual variables that describe weather conditions' influence on relevant events is only partially in compliance since the analysis carried out of the distinction between residents and tourists

In that way, the empirical research described in the article has shown that the behaviors of both above mentioned groups are different. The better the weather (non-rainy and warm), the fewer tourists (non-local)

visited the Fair, choosing other types of activities. On the other hand, this behavioral pattern has not been observed in association with the metropolis residents. In effect, the number of residents visits at the Fair is rising on sunny days. A somewhat surprising conclusion was that tourists (non-local) are 'resistant to rain' and quite willingly attended the Fair during worse, rainy weather. It can, therefore, be assumed that when it is very warm, tourists prefer to spend their time sunbathing on the beach or pursuing other activities, while on rainy days they prefer to sightsee the city, visit museums and attend the Fair. This assumption will be the subject of further research. Multiple premises indicated that residents and tourists could be considered two complementary target groups, who are willing to attend an event in different weather conditions. Nevertheless, to confirm that statement, further studies are required. Unfortunately, the SARS-CoV-2 pandemic prevents gathering data from the next edition of The St. Dominic's fair and similar events; however, research will continue.

The empirical research described in this paper provided a segmentation approach within Fair visitors, divided them into two groups the residents of Gdańsk and the metropolis (local consumer) and domestic and foreign tourist (non-local consumer) who act differently on the same weather conditions. This approach may be essential in shaping the market offer of this type of event. Moreover, in other studies about the impact of the weather conditions on customers' behaviors, attention should be drawn to the individuals of the study population.

Summing up the considerations presented in this work, it should be stated that conduction of business on the leisure market requires careful analyses of the impact the broad understand environment on consumer behavior, since consumers nowadays are offered an increasing number of alternative ways of spending free time and relatively easily adapt to the changing situation. The climate changes currently observed, the development of information technologies, or other changes in the environmental state may be the source of both opportunities and threats, depending on how well entrepreneurs comprehend the behavior of consumers.

The study as the one presented above, helps to understand processes occurring on the leisure market and provide information enabling both the development of current competitive advantage and long-term strategic decision making.

Limitation and Future Studies

The method proposed for examining the relationship between weather conditions and outdoor leisure market events attendance is limited to event of sufficient duration. If a given event lasts a day or two, comparison of a sufficient amount of weather-condition data, to make inference about consumer behavior patterns, is not possible. The outdoor St. Dominic's Fair in Poland lasts three weeks, thus the number of observations was relatively large, although in the case of rainy days, the data obtained was still insufficient. The method used, however, may be useful for studying other forms of leisure and entertainment, such as going to the cinema, theme parks, etc., where the data on attendance and the weather conditions would be much more extensive.

The research described in this article will be continued, as cognition of the relationship between the participants of various city events and the weather conditions is of significance for many stakeholders, *i.e.* event organizers, law enforcement services, public transport operators, sponsors, etc. Forecasts of the number of event participants for different weather conditions (in particular with the division intoresidents and tourists) would allow proper preparation of the offers and/or appropriate estimation of a given undertaking's profitability under various variants.

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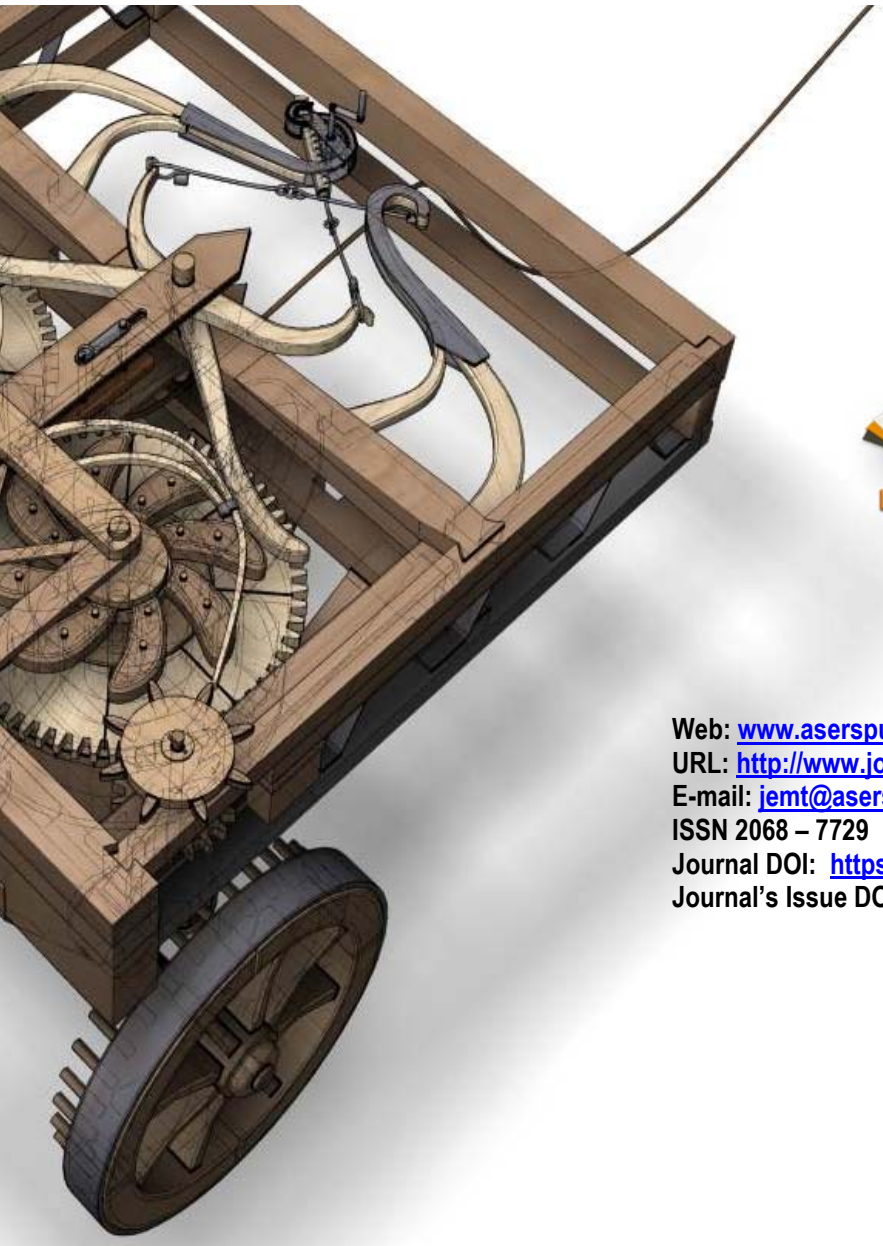

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