

Post-Pandemic Motivational Tendencies of Extreme Running Competitors In The Spatial Arrangement of Poland*

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Abstract

Previous research reinforces the understanding that event organization is an effective way to accelerate the socio-economic development of host areas – cities, regions, and countries. There are many benefits that a given area can gain from organizing events. Economic benefits are most frequently emphasized. These include increased spending, tax revenue, and infrastructure investment. As research on the importance of event organization progresses, attention has also begun to shift to other elements, namely the motivational tendencies of participants in the meetings industry, recognizing non-economic benefits such as social cohesion, marketing opportunities, and the empowerment of local communities. These elements directly motivated the launch of research on the motivational tendencies of athletes participating in sporting events.

A clear research gap has been identified in the field of meeting industry organization. This gap concerns both gaps in the literature, including significant evidence related to changes in the athletes' perception of events, as well as their preferences and needs, which could be met by an event organizer. Due to these shortcomings in the ongoing event research, this study presents important elements related to athletes' willingness to participate after the COVID-19 pandemic has ended.

The main goal of this article is to demonstrate the motivational tendencies of extreme running competitors in a spatial context. The study utilized secondary analysis of literature sources and statistical data, which allowed for the analysis of athletes participating in extreme running events based on data from the author's online portal.

The research process utilized geostatistical analysis tools, which allowed the development of a GIS model of athlete concentration with a spatial context. The research results focus on demonstrating the post-pandemic propensity of athletes to participate in sporting events, pointing to the importance of various factors, including the class of the event, the purposefulness of the start, and the atmosphere at the event.

Keywords: player tendencies, event, GIS analysis.

Introduction

In today's post-pandemic reality, driven by the difficult fight against the SARS-CoV-2 coronavirus, and dominated by digital technologies and digitized events, any sporting event that engages us physically is treated as a unique and unconventional activity. This stems from a certain shift away from spending time outdoors, in nature, which is noticeable among young people, especially children and school-age youth. Until recently, event participants included both active competitors and passive fans, eager to fill the stands or lean over the railings. The sporting events themselves were characterized by a considerable variety of scenarios and undoubtedly a rich entertainment program [1]. A distinct group of large-scale events could be identified, significantly deviating from the standard events occurring in regional or smaller local settings [2]. Although the organization of large-scale events before the pandemic was smaller than for local gatherings, there were still more of them and with greater attendance than

today, and their symbolism was associated with less affluent economic regions [3]. Despite the varying conditions in certain regions of each country, it was always possible to find some kind of event, whether it was a sports event, a sports and charity event, an outdoor event, or an event organized in an enclosed space, where participants of various ages could be observed, from children and school youth to seniors, as well as people suffering from social exclusion or struggling with certain dysfunctions of a disease nature.

The COVID-19 pandemic reversed the trend of gatherings, revealing a new way to spend free time. By shutting down society, a new way of meeting was unleashed. This, in the event industry, was initially associated with what are commonly known as virtual meetings through available online applications. These meetings were no longer organized among large groups of people, often unknown to them, but rather with one another, or perhaps in small social groups where everyone knew each other by name and was close enough to experience the same things. Such orientations contributed to negative changes in communities, including having a profound impact on the functioning of each individual. And this isn't about major global sport or the gathering of huge crowds, but about the lives of small communities, thanks to which major sport can thrive.

Considering the above, it can be said that the pandemic has devastated the meetings industry, which was developing quite rapidly and revealing a new business direction. On the other hand, the pandemic itself undoubtedly unleashed other meeting trends as well. It demonstrated the possibilities of remote communication using online tools and thus awakened in many people a love of sports, of quiet, solitary existence in nature, a very individual experience. This activity was probably not visible before the SARS-CoV-2 virus emerged. Nevertheless, the new conditions began to favor exploring nearby parks and forests and exploring nearby areas that were previously unknown to us. Outdoor gyms, such as fitness parks and street workout gyms, began to be appreciated. The mere closure of sports facilities and the cancellation of all events, matches, and tournaments had a huge impact on every economy. Various sports competitions, such as football, volleyball, and basketball matches, were played without spectators, which affected not only the country's economy but also the community's focus on television and the internet. The location of the event was no longer that important, as it was shown on the monitor, and therefore there was no possibility of any promotion or development.

Post-pandemic event gatherings have slowly begun to recover, adopting the principle of limited attendance, but also pointing out that despite caution, it's important to meet, as events trigger many emotions [4]. Building good relationships, well-being, and a sense of happiness are paramount here. Well-being itself can come from many sources, such as the pleasure of participating in events, being involved, and the joy of being close to them, even if one doesn't participate [5]. Therefore, due to their specific nature, sporting events were perceived completely differently, primarily in terms of proximity to participants, requiring a different way of greeting and not accumulating in large groups. As part of their integration efforts, organizers began to consider appropriate infrastructure to accommodate large numbers of visitors in acceptable conditions [6]. Although in rural areas, restrictions were unlikely to apply due to the event space and dispersion, including smaller gatherings [7].

The new reality has meant that events, especially sports events, require a focus on numerous criteria and elements. One such element is the event atmosphere, understood in the most general sense as the character, feeling, or mood of the place and situation [8]. Atmosphere has always been the creator of events, to which people return. It is associated with the place and the people, as well as a specific setting that is not a duplication or copy of another event. In this context, research on the atmosphere of sports events appears relatively rarely in the literature. This is usually due to the fact that it is difficult to evaluate and determine what truly attracts people to a given location or event. Researchers more often refer to the stadium atmosphere associated with football matches [9]. Although this is sometimes related to a certain positive quality of the place, which is difficult to define [10]. A focus on the participants, the place where the event is held in the context of the appropriate program and content of the event is also sometimes indicated [11]. The broadly understood atmosphere of a sporting event, which consists of various event attributes, influences the quality of event management, which is related to attributes such as competition, participants, and location [12]. A good atmosphere is sufficient to ensure customer satisfaction and loyalty, and also influences the public's perception of sporting events. A good atmosphere also influences the willingness to return to a venue, recommend it to others, and spend more money [13]. Its impact on customer decisions regarding the return visits of athletes or fans is obvious, but in the changing digital world, it requires further and broader research and more detailed models. This is especially true when considering the organization of local sporting events, where there is a clear research gap in measuring how event perceptions influence visitor decisions [14]. In this regard, there is also a research gap regarding participants' assessment of the event atmosphere and its components, especially after the pandemic. Hence, the main goal of this article is the post-pandemic motivational tendencies of athletes in participating in organized events.

Research materials and methods

Considering the specific motivational tendencies of active participants in sporting events, it is undoubtedly noticeable that it stems, on the one hand, from the specific event, meaning its prestige and established brand, while on the other hand, it depends on excellent advertising and media coverage, often supported by a person or group of people - celebrities, well-known not only in the world of sports but also generally positive about all activities. Therefore, it can be said that at every level of development, from local to regional, national, and international, the idea of organizing and successfully hosting events is essentially similar. Although, after the prolonged lockdown caused by the SARS-CoV-2 coronavirus, certain deviations can be observed, especially when it comes to non-standard events.

Such orientations also highlight and thus promote places or regions that have not previously featured on the event map. This was, in a sense, forced upon us by the pandemic, which provided a new impetus for action by communities that had previously been absent from the media. It is safe to say that in a sense, the coronavirus has created new places, but it has also become a certain limitation in the organization of large events due to the number of participants and the associated risks.

Considering the post-pandemic motivational tendencies of athletes in participating in organized events, it can be concluded that this is not a standard task, given the number of variables that can and should be examined. Therefore, using generally available methods, primarily statistical ones, may not yield the expected results. Therefore, in the context of spatial autocorrelation, it is worth using other, more advanced methods, such as geostatistics. Taking into account the spatial interpolation aspect in these methods proves extremely useful, considering that during data collection, we often have only partial data from a given event market. This leads to data gaps that influence the modeling results, which do not fit generally accepted patterns.

Geostatistical methods, in this case, are characterized by their extensive ability to estimate feature values in locations where data are unavailable [15]. Therefore, in order to demonstrate the willingness and involvement in the process of re-creating the meeting industry, it was considered appropriate to use the following hypothesis: spatial autocorrelation of events is related to the accumulation of players with similar goals, resulting from psychophysical and motivational-visual aspects.

As part of the preliminary work related to the analyzed subject of research, the issues of sports events in Poland were learned through studies of the literature on the subject, including scientific publications. In the course of the work, it was decided that the research would be carried out on the basis of a sports event called „Commando Quarter Marathon”, which takes place in Słupsk, Pomerania, Poland. The selection was made on the basis of quite large research material collected, containing information about 846 competing competitors who have different places of residence. Then, the main goal was formulated, which is related to the post-pandemic motivational tendencies of extreme runners in the spatial arrangement of Poland.

The analysis was divided into two parts. The first, a general part, focused on determining the general and specific locations of the athletes' residences, which were sorted by voivodeship. Organizing the research material proved quite difficult due to the assignment of data-residential codes-to polygons containing geodetic data for existing plots. The analysis was based on our own field and inventory research, literature on the subject, databases of spatial information systems for individual monitored areas, planning documents, and data from industry websites, including the website of the „Sub ventum” Foundation for Supporting Unconventional Initiatives, which operates the website www.biegislupsk.pl, which is linked to the national portal www.b4sport.pl. The obtained results were presented in tabular form, enabling the use of GIS tools for data processing.

The second part of the analysis was related to the selection of research tools and initial GIS processing of spatial data, geostatistical interpolation of data about event participants in the spatial system of Poland. In this analysis, the spline with barriers method was used, where areas that were inactive in terms of the presence of event participants were additionally excluded from interpolation. This method uses a mathematical function to estimate values that minimizes the overall curvature of the surface, resulting in a smooth surface that passes through the starting points. Generally speaking, it can be said that this method is analogous to the so-called „bending a sheet of rubber” to pass through known points while minimizing surface curvature. The method fits a mathematical function to a given number of closest input points by traversing the sample points [16, 17]. The density of players was determined by generating the centroid of polygon representations. Based on the obtained layer, a heatmap interpolation was made based on the proximity and density of competitors in the "Commando Quarter Marathon". For comparative purposes, the achieved results were additionally checked using the Inverse Distance Weighting method, which takes into account weighted averages of the values measured at points close to the interpolation

point as the basis for interpolation [18]. The work itself, preceding the detailed subject of the analyses, consisted of literature studies and spatial data related to the geolocation of extreme race competitors in Poland. Detailed analyzes mainly covered competitors participating in the following runs: „Commando Quarter Marathon”, „Commando Half Marathon”, „Commando Marathon”, „Commando Knife Run”, „Commando Hundred”, which could be classified as similar events in terms of the number of people and the scenario. The results were prepared in drawing, descriptive and tabular form. The research structure is shown in Figure 1.

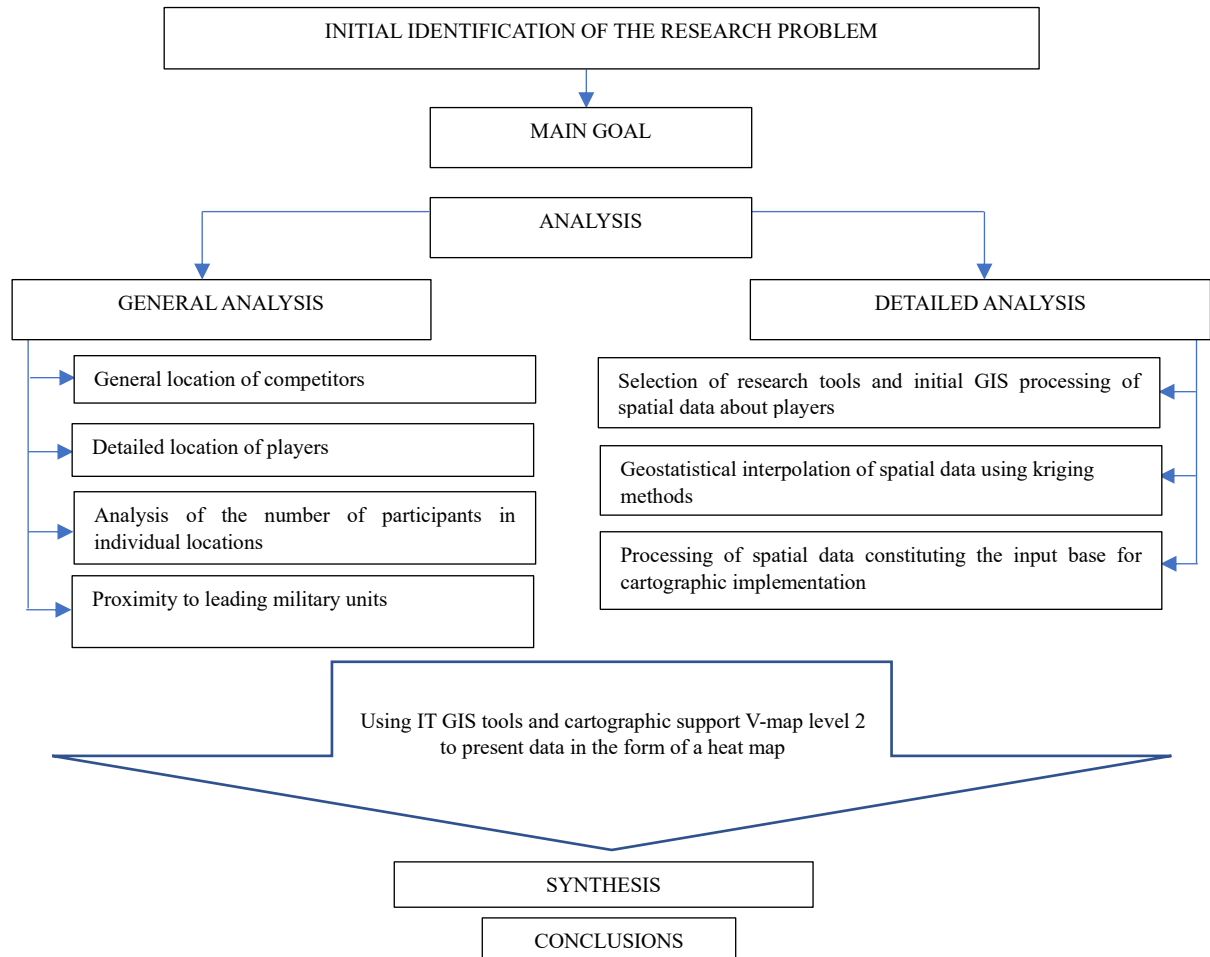


Figure 1. Research diagram

Source: Own study.

Determinants of athletes' participation in sports events

Based on the literature review, various elements influence the perception of a sporting event by active participants compared to passive participants. The atmosphere of a sporting event is related to the location of the event and its attractiveness. Equipment, infrastructure, service, information, catering, and many other elements are secondary. It's worth noting that the atmosphere of a sporting event doesn't focus on popular elements. Post-pandemic audiences are very difficult to please, as can be seen in their participation in prestigious, branded events. Nevertheless, it can be assumed that athletes' willingness to participate in events is related to the atmosphere of the sporting event, which is based on the participant's satisfaction and internal experiences. Satisfaction is crucial here and stems from good organizational aspects. Aspects such as disorganization at the event or lack of good route markings are perceived as particularly discouraging. An important recommendation for all event managers is to pay attention to the details of the event organization, such as marking where the toilets are located, where the competition office is located, where the parking lot is located, or where you can deposit your private belongings.

One of the important elements that are taken into account when choosing an event in which you want to take part is safety. And it's not about keeping your distance, as it was during the pandemic, but about your own safety and the safety of the people you came with, as well as the safety of parking your own car. The literature on the subject

indicates the importance of the safety of a sports event [19]. Safety, therefore, is not only an element of the destination, but also a strategic attribute of the event, which is present in the minds of a significant number of people associated with sports events, which leads to the development of more aversive behaviors [20]. The dominant statement here is that while there is a need to manage risk during sporting events, this should not be done at the expense of creating a sense of fear among participants. Maintaining security therefore covers many areas of event management and there are different levels of stakeholder involvement. Stakeholders should ensure that they do not limit their perspective solely to security and terrorism, but take into account all aspects of risk when planning and preparing for an event [21]. It is worth adding that the organization and safety of a sports event should also cover residents who involuntarily become its participants. It should also be remembered that a sports event is associated not only with benefits for a given town, but also with negative effects, such as high costs of organization, crowds, traffic jams, difficulties in the normal functioning of premises, noise and threats to the natural environment. Organizers must take these factors into account, although on the other hand it should be remembered that participants expect competent service and elements important for the local community are less important for them..

When examining the willingness to participate in sports events, the quality of services and participants' satisfaction play an important role, which is the driving force for future behavior [22]. Satisfaction is therefore a focal point of sports management and research because it is a consequence of service quality, which is a manageable antecedent of future intentions [23].

Post-pandemic tendencies to participate in sports events also focus on integration, sharing passion and competition. This sometimes underestimated direction leads to the omission of important issues when it comes to belonging to a given sports group. Sport undoubtedly brings people together and is a motivator for others, making them want to meet again after training. Therefore, sport in various forms contributes to building relationships and interactions between people [24]. Both organized and spontaneous sport offer many benefits in terms of social integration. It encourages contact with other people and gives the opportunity to learn and consolidate social skills, including conflict resolution [25]. For participants of post-pandemic events, passion and sport are one and the same, which are transformed into a beautiful, specific atmosphere. Through interaction with other people, you can create personal values by satisfying individual needs. It is worth adding that active participation makes experiences and values diverse and personal, especially when considering situations that occurred during the pandemic. The element that can unite all traumas is sport in its strict function with passion, which sets a common goal and simply drives the so-called meeting machine [26]. The tendency to participate in post-pandemic meetings is the result of an endless desire to play sports and participate in it, even despite other unacceptable elements.

Another quite important element in the participants' willingness to participate in sports events is competition and the opportunity to test their skills against other participants. After the pandemic caused by the initiation of the SARS CoV-2 virus, the desire to test oneself, remind oneself of the results, trophies, medals, cups and reach levels in crossing the limits of one's own weaknesses has definitely increased. In sports, even amateur ones, this trend has been strongly noticed, also among passively watching fans. You can see excitement in the eyes of every participant, which stimulates the motivation to seek experiences from the sporting event and explore new sensations.

When examining the tendency to participate in sports events, an important place is played by a good place, i.e. the location of a sports event, which must have a number of features. The destination must provide appropriate infrastructure and opportunities to create, promote and organize attractions, expand media coverage and strengthen cooperation between different entities [27]. The place, especially after the times of social closure, has become important because it is a so-called magnet that attracts new guests. Thanks to sporting events, a new group may be created, a new place may be created on the culinary and sports maps [28]. This means that organizing sports events can contribute to increasing the attractiveness of these destinations.

This element is especially important during running events, where fresh air interacts with the landscape, making the running route more attractive. It should be emphasized that running is one of the sports disciplines that attract many people and, more importantly, among this group, an attractive landscape may even be a decisive factor when choosing a place for competitions.

Post-pandemic motivational tendencies of athletes to participate in sports events based on extreme running in the spatial arrangement of Poland

Analyzing the above, it can be concluded that players' inclinations to participate in sports events are quite diverse. During the research, it was noticed that some competitions, such as extreme running, enjoy particular recognition,

and the tendency to participate in such events is completely different. An example here is the organization of the Commando Quarter Marathon, which has been held in Słupsk, the Pomeranian Voivodeship of Poland, for several years. It is a cyclical sports event dedicated to runners, mainly for uniformed services, which is part of the so-called „Commando Slam”. The „Commando Slam” itself and its achievement are associated with completing several races within one year: the „Commando Quarter Marathon” over a distance of 10.550 km, the „Commando Hundred” over a distance of 100 km, the „Commando Half Marathon” over a distance of 21.0975 km, the „Commando Marathon” over a distance of 42.195 km and the „Knife Commando” over a distance of 10 km. The aim of all events, including the „Commando Quarter Marathon”, is to popularize running as the simplest form of physical recreation, promote a healthy lifestyle, enable athletes to compete in extreme conditions, popularize competition between uniformed services and prepare participants to complete subsequent runs.

The „Commando Quarter Marathon” is a non-standard race due to the fulfillment of certain formal requirements that are not present in standard races. This is primarily about meeting certain conditions, which include wearing full field uniforms at the start and during the race. Each competitor should be equipped with: a long-sleeved uniform sweatshirt with a full-length zipper, a beret or field cap, military-style shoes with a minimum upper height of 8 inches, a backpack with dimensions of at least 45x30 cm in a color corresponding to the uniform, weighing at least 10 kg along the entire route of the race. The players could be equipped with other civilian items, although the most important thing was that their shape and color were of a military type.

The race regulations were quite detailed and, in addition to formal requirements, recommendations, and restrictions, also included important information regarding awards, which included honoring the winners in the overall men's and women's classifications, as well as in the team classification, where the three best times of the runners from the team of the same name were combined. After crossing the finish line, each runner received a cast medal. The race route itself ran along forest paths and paved roads. The „Commando Quarter Marathon” route is always marked in a mountainous landscape, featuring numerous hills, inclines, and steep descents.

An analysis of the group of runners who participated in the propensity test for participation in the „Commando Quarter Marathon” held in Słupsk in May 2025 revealed a rather diverse age structure among the 876 registered runners. The youngest participant was 18, and the oldest was 55. The average age was 32, so young people dominated, reflecting the demanding nature of the race. It's worth noting that runners came from all over Poland. The average distance between a participant's home and the race venue was 431 km, which is quite a long distance considering the distances between cities in Poland. The figure below shows the distribution of participants in the „Commando Quartermarathon”

(Figure 2).

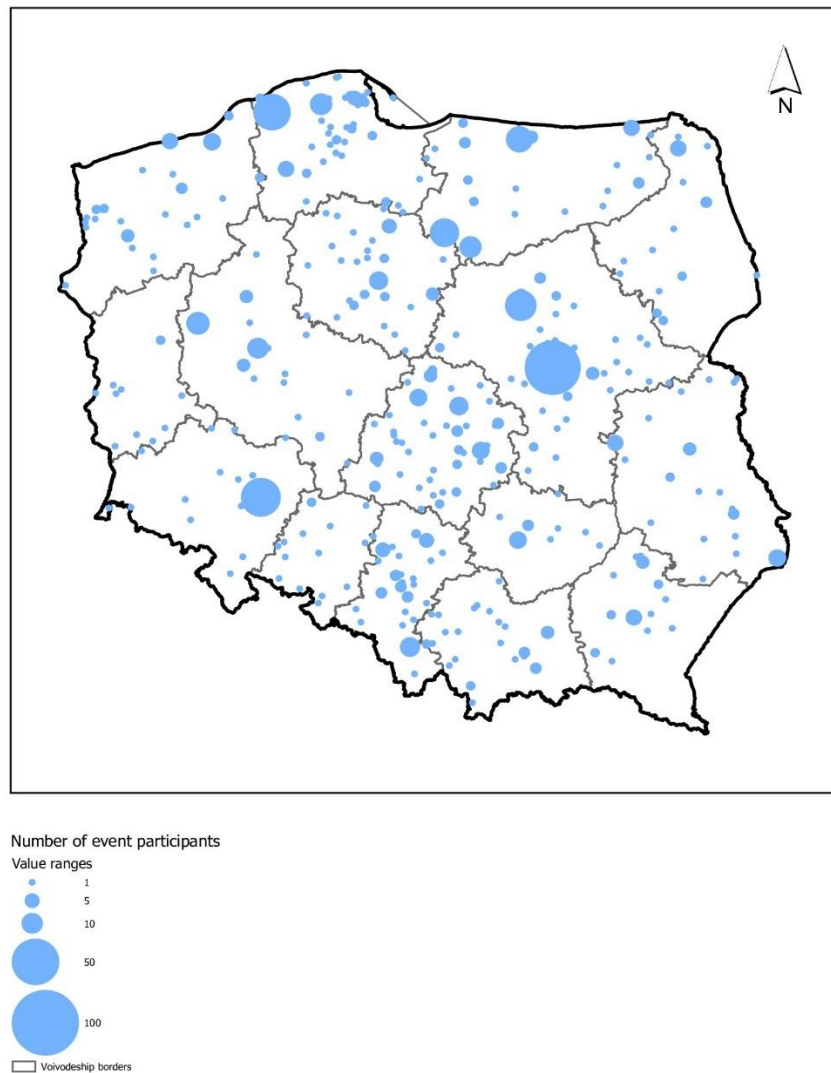


Figure 2. Distribution of the "Commando Quarter Marathon" competitors in the Polish voivodeships
Source: Own study.

An analysis of potential locations for extreme running competitors in Słupsk revealed that competitors came from all over Poland. At the same time, three regions emerged as the leading regions in terms of the number of competitors. These included the Masovian Voivodeship, with Warsaw as the leading center; the Lower Silesian Voivodeship, with Wrocław as the dominant center; and the Pomeranian Voivodeship, with Gdynia as the leading center. This is undoubtedly related to the presence of military schools in these regions. In Warsaw, this is related to the location of the Military University of Technology; in Gdynia, it is related to the location of the Naval Academy; and in Wrocław, to the location of the Military University of Land Forces. It was from these regions that the largest number of competitors came, primarily young people – cadets, i.e., future professional soldiers.

Based on the participants' location within Poland, it was deemed appropriate to group the competitors' places of residence. Location, on the one hand, is an important exogenous factor, accumulating different competitors in terms of age, military affiliation, and occupations other than professional soldiers. Competitor density was determined by generating polygon centroids of data representing the locations of places of residence within Poland. Based on the resulting layer, a heatmap interpolation was performed, based on the proximity and density of competitors who actively participated in the „Commando Quartermarathon”. During the verification stage, the obtained results were checked using the Inverse Distance Weighting method, which uses weighted averages of values measured at points near the interpolation points as the basis for interpolation. An illustration of the process implemented in Poland is presented in Figure 3.

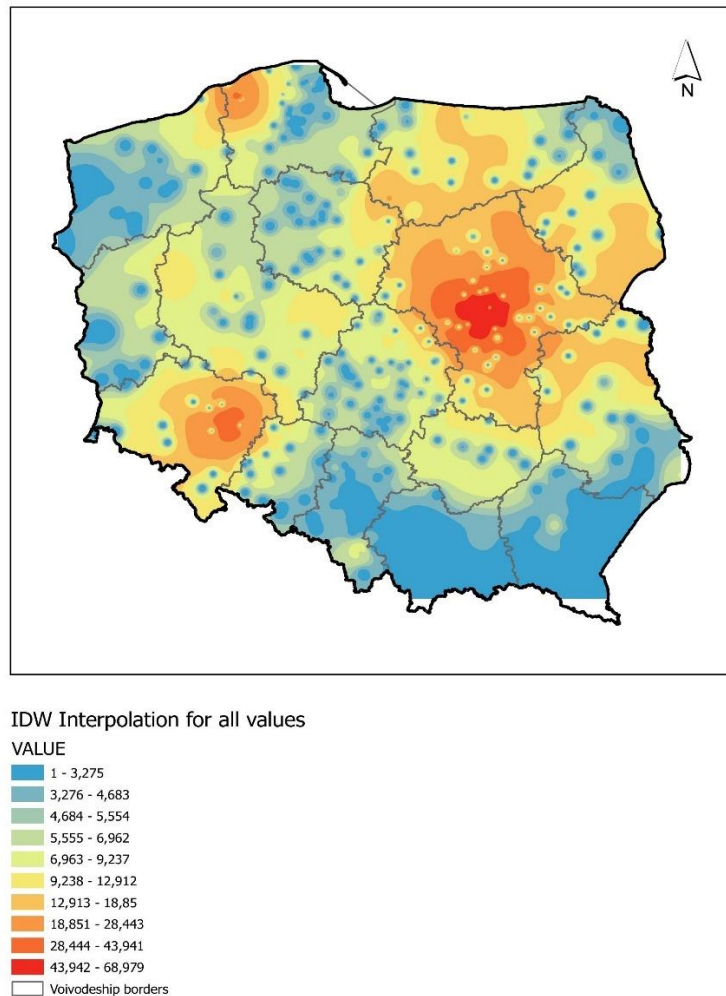


Figure 3. Concentration of „Quarter Marathon Commando” competitors in 2025

Source: Own study.

The above geostatistical analysis indicates that the concentration of participants in the „Commando Quartermarathon” is closely related to the distribution of military schools in Poland. Central Poland, the Warsaw region, is particularly concentrated, as the Military University of Technology is adjacent to other military units and uniformed services, dramatically increasing the concentration of participants. The relatively high dispersion also indicates that participants in such events create a diverse, even heterogeneous, market for events that is in a phase of continuous development. Considering the geostatistical analysis presented in Figure 3, it can be seen that gaps exist in the southern and western areas, which are not necessarily due to a lack of competitors, but rather to a lack of interest in extreme experiences among the general runner population.

As a result of the analysis of the propensity to participate in extreme events after the pandemic, the study group found that participants highly rated the event's organization, citing a positive atmosphere. This was demonstrated in an anonymous post-event survey. Due to the recent COVID-19 pandemic, participants were expected to prioritize safety. However, it's worth emphasizing that rules and safety weren't prioritized at all. The event venue, specifically the race route, proved to be a significant factor. The route was very challenging, and everyone considered this a positive aspect of the event. The attractiveness of the route and its mountainous terrain led many to confirm their participation in the next race in Słupsk.

From the opinions provided, it can be concluded that the event itself met the high expectations of the participants in terms of rules and safety as well as the organization and conduct of the event. These are very important factors related to the functioning of sports events. The class of the event was slightly less important. Participants emphasized that they took part in the event to test themselves, not for the importance of the event. Interactions with others were also rated higher, especially the possibility of sharing passion and the possibility of integration. This proves the good atmosphere at the event, which unites running enthusiasts. The competition itself turned out to be less important because the participants treated it as an additional opportunity resulting from practicing sports.

Summary

To summarize the discussion so far, the research findings indicate a complexity of factors related to the willingness to participate in sporting events following the SARS-CoV-2 pandemic. This article attempts to define these willingness to participate, demonstrating the dispersion of participants across Poland. It is worth emphasizing that this perspective is from the perspective of event participants actively participating in extreme running events. Referring to the literature, it is worth mentioning that these willingness to participate is focused on three basic dimensions: the organization of the event, the relationships between participants, and the event location. The research shows that the atmosphere is a key element in building a sporting event. All analyzed factors proved important and highly rated by event participants, with a focus on satisfaction with the running event.

In terms of practical implications, organizing a sporting event, especially after the pandemic, requires exceptional commitment and attention to detail. Organizers should pay attention not only to hard elements such as the rules, the venue, and the route, but also to soft factors related to the participants' feelings, such as a sense of community and shared passion. This is a difficult task, but necessary in the process of building an atmosphere that subsequently translates into attendance and participant loyalty, thus determining the event's success. A successful sporting event can also encourage participants to return to the venue on dates other than the event itself and contribute to the development of subsequent events. Decision-makers should support organizers of recurring events. This is a way to attract not only participants but also to develop the area more broadly. In this approach, decision-makers should treat a positive atmosphere at a sporting event as a draw and an important element in building the image not only of the event but also of the area. It is also worthwhile to engage the local community in the process of building a positive atmosphere for the event. This will help create the appropriate backdrop for the event.

The study results confirm the achievement of the goal aimed at demonstrating the post-pandemic propensity of athletes to participate in sporting events, pointing to the importance of various factors. It is worth noting that the quality of the event proved less important to the surveyed participants than other elements of the atmosphere. They participated in the competition primarily to test their skills. It is worth emphasizing that the participants are not professional athletes, but amateurs. However, achieving the set goals is relevant here, as with professional athletes. For amateurs, participating and testing one's abilities and skills is more important, although in terms of winning the previously mentioned "Commando Szlam," it's also important to win a trophy after all the races and a medal with a ribbon, which a soldier or uniformed service officer can pin to their uniform. And here, the medal itself is crucial, demonstrating in public that the athlete has achieved something many people will never achieve.

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