

# HUNGARIAN GEOGRAPHICAL BULLETIN



**Current trends in the global mobility:  
theory, method and practice**

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## CONTENT

Current trends in the global mobility: theory, method and practice	
<i>Carmelo Ulises Mesa-Pérez, Juan Manuel Parreño-Castellano and Josefina Domínguez-Mujica:</i> Border control and accident rate of irregular immigration in the route to the Canary Islands (Spain) during the COVID-19 pandemic .....	101
<i>Cristóbal Mendoza:</i> International immigration and entrepreneurship in rural areas of the Spanish Pyrenees .....	119
<i>Elina Apsite-Berina, Liga Daniela Robate, Maris Berzins, Girts Burgmanis and Zaiga Krisjane:</i> International student mobility to non-traditional destination countries: evidence from a host country .....	133
<i>Mihály Tömöri and Barbara Staniscia:</i> The impact of the COVID-19 pandemic on cross-border shopping tourism: the case of Hungary .....	147
<i>Gábor Michalkó, Márton Prorok, Attila Csaba Kondor, Noémi Ilyés and Tünde Szabó:</i> Mobility patterns of satellite travellers based on mobile phone cellular data .....	163

## Other studies

<i>Mateusz Jankiewicz:</i> Regional economic growth and unemployment in the European Union – a spatio-temporal analysis at the NUTS-2 level (2013–2019) .....	179
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## Book review section

<i>Solarz, M.W. (ed.):</i> Atlas of Poland's Political Geography. Poland in the Modern World: 2022 Perspective ( <i>György Farkas</i> ) .....	193
<i>Gyuris, F., Michel, B. and Paulus, K. (eds.):</i> Recalibrating the Quantitative Revolution in Geography: Travels, Networks, Translations ( <i>György Mikle</i> ) .....	197

## Chronicle

In memoriam Ferenc Schweitzer (1939–2023) ( <i>Szabolcs Ákos Fábrián, Gábor Varga and Dénes Lóczy</i> ) ..	201
In memoriam Armando Montanari (1946–2023) ( <i>Gábor Michalkó</i> ) .....	203



## Border control and accident rate of irregular immigration in the route to the Canary Islands (Spain) during the COVID-19 pandemic

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### Abstract

Throughout the first decades of the 21<sup>st</sup> century, the maritime borders of the European Union have witnessed a growing and increasingly complex mobility of an irregular nature. Moreover, the effects of the COVID-19 crisis on many African countries revealed the weakness of the maritime border and its permeability, as well as its increased danger. This research aims to study these irregular migration flows by sea during 2020 and 2021, through the Atlantic border between the Canary Islands and Africa. The so-called “Canary route” is one of the most dangerous maritime routes in the world due to the ocean conditions, the distances that must be covered and the way in which migrants move. Our analysis will therefore focus on one of the central aspects of this crossing, its danger and associated accident rate, which can be measured in terms of the number of shipwrecks, deaths, and missing persons. The objectives of this paper are: i) to show the spatial location of those wrecks; ii) to give an estimate of data on missing persons and deaths; iii) to focus on the study of those persons affected; iv) to delve into the underlying causes; and v) to analyse the border control actions developed during the pandemic. With this aim, information has been compiled from different national and international sources: official records, contrasted data provided by some NGOs and the IOM, and testimonies of the agents involved. This material is used to reflect on the normalization of border control as a factor that inevitably leads to deaths and disappearances. It suggests that this event should be a central element in European migration policy, contributing to designing border control actions that go beyond containment, thereby preventing the loss of human lives.

**Keywords:** irregular migrations, Atlantic maritime border, migration controls, accidents in migration routes, Canary Islands

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### Introduction

For the last two decades, the Canary Islands have been one of the external borders of the European Union with a significant flow of irregular migration from northwest African countries. During the pandemic, coinciding with the increased immobility of the Spanish population, there was a growth in the arrival of irregular immigrants to the islands

(UNODC, 2022). The health crisis, which began in 2020, boosted the migratory processes due to the serious economic situation of the surrounding countries, the increase of difficulties in the repatriation processes, the decrease in the control of flows in the sending countries and the use of clandestine migration as a geopolitical tool, especially by Morocco.

The International Organization for Migration calls for promoting safe and

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regular migration (IOM, 2022a, b) in line with Sustainable Development Target 10.7 (to facilitate orderly, safe, and responsible migration and mobility of people, including the implementation of planned and well-managed migration policies); the target most explicitly and directly related to international migration of the 2030 Agenda for Sustainable Development (UNDP, 2023) and the Global Compact for Migration, forged in the UN member states' meeting celebrated in Morocco in 2018, which calls on states to save lives, undertake coordinated international initiatives on missing migrants and promote safe, orderly and regular migration (UN, 2018). However, the migration flows under study offer an opposite example because of the insecurity characterizing those from northwest Africa to the Canary Islands during the pandemic.

In this article we will focus on the analysis of these flows and especially on the study of the levels of accidents reached. Specifically, we are interested in knowing the magnitude of the phenomenon expressed through the number of incidents and the number of people killed and missing. It is also important to show cartographically its territorial distribution, represent its temporality, characterize who are those affected and deepen in the knowledge of the causes. The second objective of this article focuses on the analysis of the border control policies developed by Spain during the pandemic as a factor in the migratory process. Beyond the rescue actions, which have partially alleviated the number of victims, this article studies the relationship between the political action developed and the nature of the migratory model that seems to have included the accident rate as a variable to be controlled, but consubstantial to the migratory model.

In order to achieve these objectives, we will use data from various official and non-governmental sources, as well as opinions expressed by experts, immigrants and agents involved. The paper begins with a contextualization section on border control in the European Union and the northwest African border, to present,

after the presentation of the sources used, the main results of the study on the flows that have occurred during the pandemic and the political action carried out by Spain.

## The framework of the research

### *European border control and migration*

A frontier constitutes a territorial entity contributing to forge the nation's personality that must be preserved. Therefore, from the European perspective, strengthening border measures is seen as a remedy ensuring state security *vis-à-vis* external threats (JAKUBOWSKI, A. 2022) and, for this reason, the EU Member States continue to be dominant players in the border control policymaking, developing immigration controls at nation-state and supra-national levels (BASSA, L. 2009).

Consequently, the danger and accident rate affecting irregular migration in the Balkan route, or by sea on the Mediterranean and the Atlantic routes cannot be considered out of the framework of the securitization of European Community policy. As migration has captured the political agenda, the link between migration and security has been underpinned by a traditional military-political understanding of security (LÉONARD, S. and KAUNERT, C. 2022). It is a securitization framework that has contributed to the construction of the so-called "Fortress Europe", following the Schengen Agreement of 1985. This international treaty, one of the constituent treaties of the European Union, was designed to consolidate the free internal movement of citizens, based on the abolition of internal border controls in several EU countries, while strengthening border controls with third countries. Consequently, successive strategies were developed to implement the principle of control of the external perimeter of the Union and to reinforce the surveillance system directed at it.

The most outstanding action of this system was the creation of the European Border and Coast Guard Agency (Frontex) in 2004, as

well as the continuous initiatives for its progressive modernization and for the reinforcement of its operations. Both this instrument and the gradual use of sophisticated technology: radars and sensors, camera surveillance systems, unmanned aerial systems, and large-scale IT systems handling biometric data (DIJSTELBLOEM, H. et al. 2011; DOMÍNGUEZ-MUJICA, J. et al. 2016; GERSTEIN, D.M. et al. 2018), have been considered as a clear example of the so-called hard governance of the EU migration policy (RUIZ BENEDICTO, A. and BRUNET, P. 2018), a border control policy that continued to develop in 2020 and 2021, despite the expansion of the pandemic.

In addition to these control and surveillance actions, some of the countries of the Union, such as Spain, have developed their own initiatives to implement political measures to control irregular immigration, not only through their own agents, but also through deterrence strategies, to prevent, contain and hinder the arrival and settlement of those immigrants who try to reach the coasts in unauthorized vessels (LÓPEZ-SALA, A. 2015). These actions have been defined by different scholars as soft governance measures: flexible structures, committees, and networks (DUDEK, C. and PESTANO, C. 2019; BA PALMQVIST, P. 2021). These are initiatives that are implemented through cooperation agreements with the governments of the countries from which migrants originate, in the form of aid packages to stop immigration at its source. In other words, the policy adopted by the Government of Spain to curb immigration combines the use of border control mechanisms (surveillance with human and technological means) and an active bilateral coordination and cooperation with transit and origin countries (GODENAU, D. and LÓPEZ-SALA, A. 2016).

In the latter case, Spain's bilateral agreements with several African countries also include the activation of sea patrol operations within the territorial waters of third countries, with the 18N parallel being the main control zone, the area over which most surveillance is carried out. These actions can be considered as extraterritorial strategies which extend

the interception powers of Spain to maritime zones under the sovereignty of other States, even though the authority of the States to intercept the type of vessels with no nationality used by migrants allows the application of the Smuggling Protocol under UNCLOS (United Nations Convention on the Law of the Sea). "Therefore, their mere existence would generate a rescue obligation, which must be fulfilled irrespective of the legal nature of the waters where the boat is located" (GARCÍA ANDRADE, P. 2010, 315). However, the implementation of all these procedures has not prevented the continued occurrence of numerous irregular migration flows in the West African route, as well as the associated accidents and fatalities (shipwrecks with consequent disappearances and deaths).

#### *The sequence of irregular immigration flows along the Atlantic route*

The surveillance of a maritime area, as opposed to a line in the case of land borders, is much more complex (SPIJKERBOER, T. 2007). Surveillance actions, which aim to locate the small boats or *cayucos* carrying migrants in an irregular manner, act from two opposing assumptions: from the principle of security, which seeks to prevent these flows, and from the humanitarian basis, that of protecting migrants from possible fatalities (GODENAU, D. and BURASCHI, D. 2019). Whether we analyse migration control from the first perspective or from the second, it is confirmed that the expected results are not achieved. Many of the migrants reach the coast of the Canary Islands by their own means, without intermediate controls, while many others get lost in the Atlantic since, despite all the devices deployed to track migration in unauthorized vessels, the number of those intercepted is limited.

In relation to the flows, some authors have referred to three distinct phases of irregular immigration to the Canary Islands in the past (GODENAU, D. 2014; IDEMUDIA, E. and BOEHNEKE, K. 2020): i) the initial phase, that of the first small boats that reached the

eastern coasts of the Canary Islands from Morocco, in the second half of the 1990s of the 20<sup>th</sup> century; ii) the second, that of 2000–2008, in which we presume that the number of fatalities increased significantly, given the considerable number of migrants coming from southern departing points (Mauritania, Senegal, Gambia, Guinea and Sierra Leone), and which had its epicentre in 2006, in the so-called “cayuco crisis”; iii) the third, in which irregular immigration flows decreased notably and, therefore, fatalities. These years coincided with a period of deep economic recession in Spain and also with increased surveillance and deterrence policy, based on agreements signed with emitting countries (PEREGIL, F. 2015). Since 2018, a slight upturn in irregular migration has been noticed, which acquired an unusual intensity during the pandemic (DOMÍNGUEZ-MUJICA, J. et al. 2022), to the point that we can speak of a fourth phase. In this phase, accidents and fatalities have grown very intensely, becoming one of the central elements that define this period. This is the focus of our study.

## Sources and methodology

The two main sources used to know how many and who are the dead and missing are the Missing Migrants Project of the International Organization for Migration (IOM) and the reports of the NGO Ca-minando Fronteras. The former is a valuable source that reports on migrants who have died or disappeared at the borders of the European Union, including data on the date of death or disappearance, sex and status as a minor, if applicable, place of origin, cause of death, location of the incident, and the source and quality of the data. Therefore, it only takes into account a few demographic variables, in addition to the fact that it only computes a portion of the deceased and not deaths that occur in migrant detention centres, refugee camps or similar centres, after deportation of the migrant to his or her place of origin or after settlement at the place of destination. Also excluded are deaths

that occur within the countries of origin, even if they are part of an international migration process. In the case of missing persons, the information included must contain contrasted evidence. For all these reasons, it is a recognized source of information, but it includes some underreporting. In the present case, a large number of people crossing the desert and the Sahel area are not being counted, and a large number of disappearances at sea are not adequately recorded.

The other source used are the records and reports of the NGO Ca-minando Fronteras. This is an NGO that operates on the western Euro-African border and has, as one of its main objectives that of making visible the deaths and disappearances that occur in this area. To this end, they report on each of the tragedies that occur on the Canary route, including in their information the day and place of departure and shipwreck and the number of people affected. Not only do they carry out a monitoring task, but they also provide valuable qualitative information. It is not an exhaustive source, but it is of great testimonial value.

In addition to these two main sources, qualitative information was collected by consulting the testimonies of 20 agents, experts and migrants, through 18 semi-structured interviews. Specifically, six representatives and volunteers from the Somos Red, Red Cross, White Cross and Village du Migrant NGOs were interviewed. The interview, therefore, allows access to diverse profiles in order to obtain the broadest possible view from the daily practice of the reality surrounding the arrival and reception of irregular migrants. In addition, two teachers from the public education system were interviewed because of their dual role as teachers in contact with migrant minors and as volunteers in reception associations.

In addition, two members of the military personnel involved in search and rescue were interviewed. These were two officers who regularly participate in rescue operations and who also carry out coordinating functions. Their testimonies were therefore of great importance for a thorough understanding of border control policy.

Six journalists and academics specialized in the subject were also interviewed. These were two specialist researchers from the two public universities in the Canary Islands, others from Senegal and two journalists of recognized prestige, specialists in African issues and working in Africa for reputable Spanish media. This group of interviews included people with diverse backgrounds (journalists, anthropologists, sociologists, etc.) and allowed, above all, contextualization of the subject matter addressed, given the extensive experience and academic vision of the interviewees.

Finally, four immigrants residing in shelters were interviewed. These are people who arrived irregularly in the Canary Islands and have been residing on the islands for more than six months in shelters managed by non-governmental organizations and volunteers. These testimonies focused on the personal experience of their migratory process and their expectations.

Most of the interviews were conducted in person in the Canary Islands, but some via videoconference with the countries of origin. Some interviews required a translator. The interviews were transcribed after having been recorded.

The interviews addressed the issue of dangerousness and accidents within a broader approach. These testimonies have been used to confirm the generalized concern for a new accident prevention procedure, an idea unanimously expressed by all interviewees.

The quantitative information was integrated into a single database, and the information was filtered to avoid duplicating records regardless of their origin. A statistical and cartographic treatment of these data was carried out. For the latter, a territorial information system (GIS) was created from the geographical coordinates of the sightings.

### **Irregular migration through the Canary Islands route and underlying causes**

After a prolonged period with reduced figures in the arrivals of irregular immigrants by sea to the Canary Islands, the data of arrivals have experienced a dizzying growth

during the pandemic. According to the Ministry of the Interior, in 2020, 23,271 people arrived to the islands in 759 boats, a figure similar to the 22,249 immigrants estimated by the United Nations High Commissioner for Refugees (UNHCR). In 2021, still in the pandemic period, the total figure of the Ministry of Interior amounted to 22,316 people in 542 boats and, in 2022, the data, as of December 15, still inform us of the arrival of 15,466.

The relevance of the Canary Islands route during the pandemic becomes clear if we consider, firstly, that, previously, in 2018 and especially 2019, the values were only 1,307 and 2,698 migrants, respectively, in a context of growth with respect to previous years. And, secondly, that 55.3 percent in 2020 and 53.2 percent in 2021 of the immigrants arriving non-regularly to Spain by sea and land did so through the Canary Islands.

Most of the migrants arriving between 2020 and 2021 were young people from Morocco, Western Sahara, Mauritania, Senegal, Gambia, Guinea Bissau, Guinea and Mali, with an increase in those from Côte d'Ivoire, Ghana and Nigeria in 2021 (CEAR, 2022a). Around 15 percent of these migrants were unaccompanied minors in 2020 (Defensor del Pueblo, 2021) and, in 2021, women and children increased in number, becoming 28 percent of arrivals.

These are complex migratory flows in terms of migrant motivation. In all cases, migration responds to the search for a better life, but we can recognize different types of mobility: a) that of migrants fleeing the "structural" poverty of their areas of origin, increased in recent years by climatic factors and by the first signs of food crisis; b) people who are finding it increasingly difficult to earn a living due to the destruction of the resources that allowed them to subsist; c) migrants who have had to leave their homes as a result of the economic paralysis brought about by the pandemic or the recent increase in inflation; d) refugees fleeing armed and inter-ethnic conflicts or persecuted for various reasons (sexual orientation, political activism, etc.); e) people who migrate to join their spouses, children and family members, etc.

“Structural” and long-lasting poverty and the lack of job prospects are the main factors driving the northwest African population out of their places of residence. Most of those migrating for these reasons come from the countries of the Western Sahel, in many cases from rural areas, driven out by the drought of recent years, but also from other areas such as southern Morocco. There, the prolonged drought that began in 2017 and the lack of provision of alternative water resources have characterized the evolution of its economic sector, which accounts for between 13 and 20 percent of GDP, following the implementation of the Green Morocco Plan, which will be complemented by the so-called “Generation Green 2020–2030” (WAHID, N. *et al.* 2022), and which has favoured the migratory process from the most arid rural areas.

The destruction of resources is also a major emigration factor. The emigration of Senegalese, Gambians, Mauritians and Guineans, in addition to responding to the economic hardship generated by the pandemic, is also the result of local factors, such as the fishing conflict that the region has been experiencing for years and which is causing fishermen and employees of traditional fish processing industries to find it increasingly difficult to survive (BELHABIB, D. *et al.* 2019).

“Now there is no fish, there is nothing now (...) four hours sailing offshore, then you are there three or four days fishing and cooking and after three or four days you return (...) 90 kilometres and you catch nothing (...) Chinese boats, from Europe, they all come to Senegal to fish in big boats (...) they take it to other countries, nothing stays in Senegal” (Senegalese immigrant living in a reception centre in Gran Canaria).

Along with the arrival of large industrial fishing vessels in the area, the lack of management measures to regenerate the resources and the establishment of fishmeal and fish oil factories are resulting in a high number of people losing their traditional way of life. This situation has been compounded by the fact that, during the pandemic, fishermen and traditional factories have been restricted for health reasons. Consequently, clandestine boat

departures from the ports of St. Louis, Mbour and Ziguinchor in Senegal, Banjul in Gambia, Bissau in Guinea-Bissau or Nouadhibou in Mauritania more frequently include people directly or indirectly linked to the fishing sector (BENNETT, N.J. *et al.* 2020; CISSÉ, I. 2020).

The increase in arrivals to the Canary Islands in 2020 and 2021 has also been interpreted as a consequence of the health crisis caused by the pandemic and its socioeconomic impacts on the migrants’ countries of origin (RODRÍGUEZ SALINAS, R. 2022). For example, in the case of Morocco, the pandemic sharply decreased international tourist flows (ATTAHIR, O. 2020), triggering workers, especially in informal activities linked to tourism, to try to reach the Canary Islands. Nor should we fail to mention the increase in mobility as a result of the inflationary processes experienced by some countries such as Ghana or Sierra Leone, which have been perpetuated by the current energy crisis (JACKSON, E. *et al.* 2020). In another sense, the idea has spread that the pandemic has reduced the adult population in Europe and that this generates job opportunities. A representative of the NGO “Village du Migrant”, which focuses on helping Senegalese returnees, expressed himself in this sense when he referred to the reasons for irregular migration:

“The first reason is the lack of employment. It is an economic-social and professional problem (...). The second reason is social pressure, if there is no work there is social pressure and the third reason is the pandemic. Europe has lost many adult lives and migrants want to leave to get work and replace these deaths in Europe.”

A part of the flows is associated with political reasons and the existence of armed conflicts and situations of social violence. The arrival of Malians since 2019 is the best example of forced movements. The grave war and inter-ethnic violence that this country has been suffering since 2012, especially in the northern regions, has led to the displacement of more than one million people (BRATTON, M. 2016), a part of whom have crossed the desert to embark in the ports of Senegal or Mauritania for the islands. In addition,

lately, interethnic violence has been spreading to Niger and Burkina Faso. In Burkina Faso, 682,000 people had to move within the country in 2021 according to the Internal Displacement Monitoring Centre (IDCM, 2021). Nor should we forget the increase in arrivals from Guinea, motivated by institutional repression, political instability and interethnic strife (ALAEJOS GARCIA, E. 2021).

Finally, the migratory upturn is related to an increase in smuggling and trafficking business and to the migratory policies developed by some countries around the Canary Islands as a tool for political negotiation. For example, in this regard it is worth mentioning the fact that, on the part of Morocco, the control of irregular migration to Spain has been used as a bargaining tool in relation to issues such as Spain's position on the Saharawi cause. According to CASSARINO, J.P. (2022), the intention of third countries to exert pressure on European countries through migration control is not a new phenomenon. What is unprecedented has been the explicitness of the Moroccan intentions to instrumentalize migration.

## **A dangerous migration route**

### *Accident rates during the pandemic*

Dangerousness and accidents are characteristic of the Canary Islands migratory route. Although the figures confirming this are always inaccurate, the IOM's Missing Migrants Project allows us to approximate the dimension of the phenomenon. According to this project, in both years, there were 141 incidents and the number of dead and missing in this period estimated at 1,986 people. In 2020, the number of deaths and missing persons recorded was 877, which was 4.5 percent of the total number of those rescued by Salvamento Marítimo (Spanish Search and Rescue) in that year. In 2021, the figure was 1,109 dead and missing, representing 6.1 percent of those rescued. This last figure is similar to that provided by UNHCR (2022), which counted 1,153 dead and missing in 2021.

The data on deaths and missing persons from the Ca-minando Fronteras NGO is higher. According to this NGO, in 2020 there were 1,851 dead and missing in 45 incidents. In 2021 the figure rose to 4,016, in 124 incidents. These magnitudes are so high that, if we put them in relation to the figures for people rescued by Salvamento Marítimo, they represent 10.1 percent in 2020 and 22.2 percent in 2021. This means that one migrant disappeared or died for every 10 rescued in 2020 and that, in 2021, this proportion rose to more than two. Ca-minando Fronteras has estimated a total number of 7,692 victims in the period 2018–2022 on the so-called Canary route.

The fact that there are no national records, that counting criteria may differ between different organizations, and that an indefinite number of vessels and people are not found, leads to a certain disparity in the figures. In this context, from the incident records available from different sources, we have created our own database which should be interpreted as another approximation of what is really happening. In our sample, the total numbers of incidents and of dead and missing persons reach intermediate values. In 2020, 88 incidents were included, accounting for 1,762 dead and missing migrants, while, in 2021, the total data amounted to 132 shipwrecks and 2,943 people. Disregarding the disparities in the figures, what is obvious is that the Canary Islands maritime border is characterized by the persistence of the accident rate, something that has increased during the pandemic period, especially in 2021 (CEAR, 2021).

Data from the Missing Migrants Project allow us to delve deeper into some of the characteristics of the incidents. Although the incident with the highest number of dead and missing, which occurred on 24 October 2020, involved the loss of 141 people, the majority of incidents, 61.2 percent were characterized as involving fewer than 10 victims. The number of dead and missing persons, on average, was 14 persons per incident. From a temporal point of view, most of the incidents were recorded in the second half of the year, from June inclusive, coinciding with the period in

which there is usually a greater transfer of irregular migrants to the Canary Islands (Figure 1). In terms of territorial location, the majority occurred on the high seas, in waters relatively close to the south and east of the coasts of the archipelago. However, a considerable number of incidents were also recorded south of the Port of Boujdour (Western Sahara), many of them in Saharan, Mauritanian and Senegalese coastal waters. Figure 2 shows that in 2021 the incidents recorded with fatalities were concentrated between

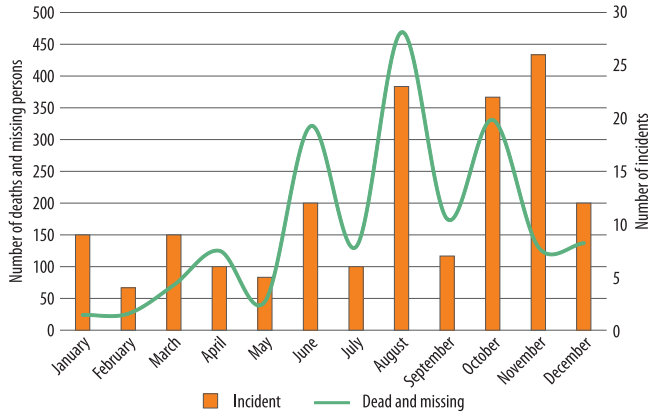


Fig. 1. Number of incidents, deaths and missing persons per month for years 2020 and 2021. Source: IOM. Authors’ own elaboration.

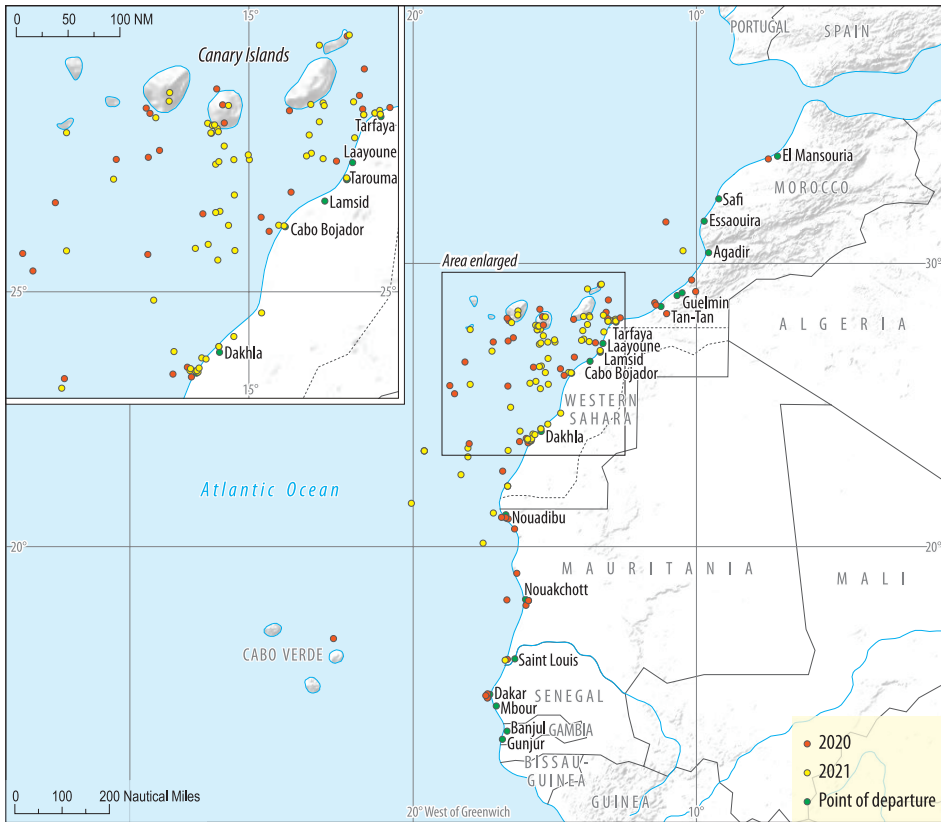


Fig. 2. Location of incidents recorded in 2020 (red) and 2021 (yellow) in which deaths and missing persons were reported. Source: IOM. Authors’ own elaboration.

the Canary Islands and Nouadhibou, north of Mauritania, while in 2020 the location was more dispersed, with some cases recorded off the coast of Dakar in Senegal, the island of Sal in Cape Verde and Playa David, near Mohammed in Morocco.

### Invisibilized victims

With the imprecision that surrounds irregular migratory flows to the Canary Islands, we can affirm that most of the victims have the status of missing persons, despite the fact that, as CARLING, J. (2007, 330) points out, “migrant deaths at sea are particularly difficult to quantify because the bodies are often missing. In

most cases, estimates of presumed drownings are based on survivors’ accounts of the number of passengers”. Some non-governmental organizations, such as Ca-minando Fronteras, provide estimates of the number of missing persons, although this information is only available for the most recent period (2018–2022) (Observatorio..., 2022). Following these data, in 2020 and 2021 the number of missing persons accounted for most of the victims that occurred at the border.

Figure 3 shows a sample of episodes in which deaths or missing persons were recorded and for which the point of departure and place of interception are known. As can be seen, they come indistinctly from the different countries of Northwest Africa,

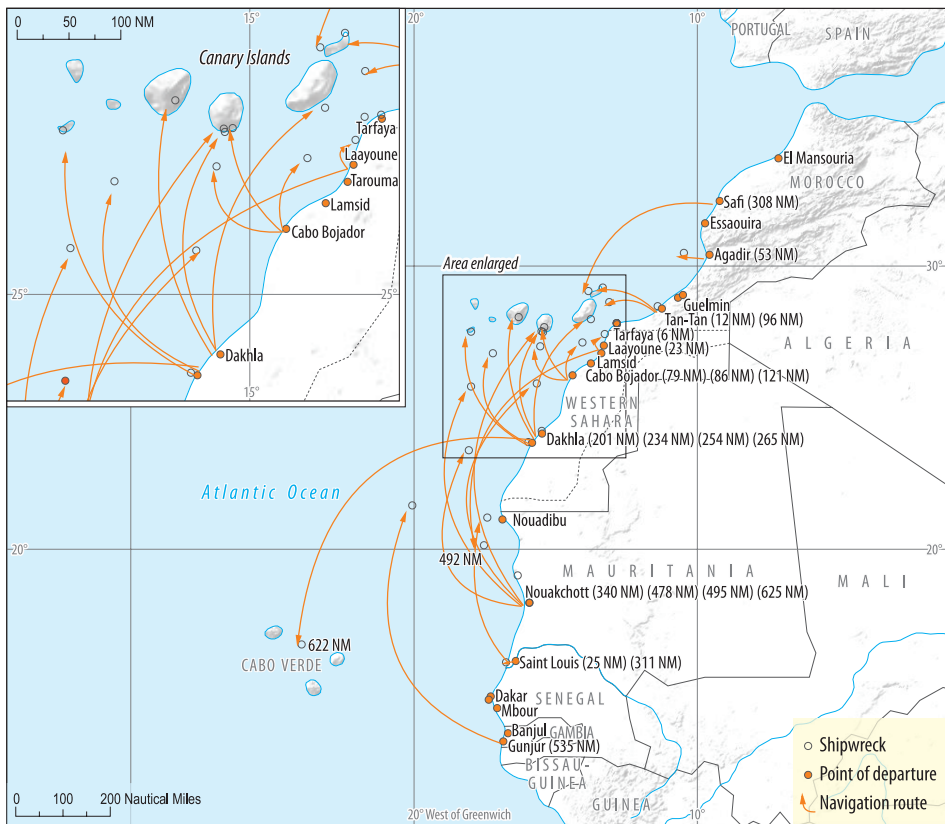


Fig. 3. Ports of departure and point of sighting of vessels in which deaths and missing persons occurred. Source: Ca-minando Fronteras. Authors’ own elaboration.

in many cases from places remote from the Canary Islands. It is estimated, based on the actions of family members and the NGO Caminando Fronteras, that 51 percent of the missing persons departed from the coasts of Western Sahara, especially from Dakhla, Laayoune and its port, Blaya; Cape Boujdour, Tarouma and Lamsid. Mauritania accounts for 16.9 percent of the missing, especially from Nouakchott and Nouadhibou; Morocco, 9.8 percent, especially from Tarfaya, Agadir, Tan Tan, Essaouria and Safi; Senegal, 8.7 percent, mostly from Mbour, Saint Louis and Dakar; and Banjul and Gunjur in the Gambia, 6.9 percent. Therefore, the invisibility of the victims is related to origins generally located to the southeast of the Canary Islands. Most of these accidents were found in route locations, but others suffered significant drifts. These are those of which, on occasions, there is no news at all. As one of the RCC Canarias coordinators we interviewed pointed out:

“In the humanitarian crisis of 2007–2008, I remember that they said that out of every 3 boats, one never arrived, that is, one was always lost, that’s what they said back then. I think that proportionally it is much lower, but well, it is clear that they are lost (...) at the moment they pass the vertical of El Hierro, there the maritime traffic is reduced a lot and unless they are lucky, it is complicated to find the boat.”

The case of a vessel that left Dakhla and was found near Cape Verde, after traveling 622 nautical miles, is a representative example of many others that were probably lost without trace.

Family members and Caminando Fronteras have tried to give a face to these unfound victims. From the record of their actions to recover the trail of these people, it is known that the majority are young men, although in 2021 the number of women and children grew considerably, in correspondence with the increase of both groups among those who arrived or were rescued (24% and 8.9%, respectively). Those of sub-Saharan nationality abound, although a part are Moroccans. They generally began their migratory journey as part of a family strategy

to improve their living conditions, and there is no lack of cases in which they are united by kinship. But this does not mean that family members know or plan the migration process. It seems that many make the decision individually, as several migrants interviewed pointed out to us:

“No, no, I don’t tell my mother anything because if my mother knows, she thinks a lot because, you know, a lot of kids die in the sea, a lot of boats sink in the sea, a lot of young dead kids. If I go to Spain, my family does not sleep peacefully (...), and when I arrive in Spain, I do.”

## Causes of accidents

### *Environmental, technical, and human factors*

The accident and mortality rates of the Canary Islands migratory route are directly related to the long duration of many of the journeys and to the presence of certain environmental, technical and human factors in the migratory process. Beyond these factors, the irregularity of the process is the main cause that explains the levels of accidents. We must not forget that this is a clandestine mobility involving organized groups operating outside the law and usually charging large sums of money for the transfers.

The physical or environmental factors of the crossings are given by the atmospheric conditions and the state of the sea. This last and the influence of the trade winds vary throughout the year around the islands, denoting a marked seasonality in the migratory processes, which is characterized by the concentration of trips in summer and autumn, when the sea is in better conditions for navigation (MESA-PÉREZ, C.U. and PARREÑO-CASTELLANO, J.M. 2020). This implies that migrants must endure high temperatures and strong insolation during their journeys. In addition, they are often affected by hypothermia, both because they cannot avoid getting wet, and because of the greater loss of human body heat at sea due to the contrast in temperatures between day and night. All this explains the high number of

people who die or arrive in poor health to the islands. Added to this is the fact that crossings often last several days, increasing the likelihood of changes in environmental conditions and the state of the sea, leading to an increase in the number of casualties.

The technical factors are those related to the vessels used, the navigation equipment and the expertise of the skippers. Most migrants make their crossings in vessels designed for short trips in waters close to the coast (*pateras*), for artisanal fishing (*cayucos*) or for recreational activities (inflatable boats) (MESA-PÉREZ, C.U. and PARREÑO-CASTELLANO, J.M. 2021). The typologies of the vessels are therefore not suitable for navigation in oceanic waters, especially in the case of trips of more than one day. This is compounded by the lack of experience of the skippers. These are usually people with knowledge of navigation, fishermen or migrants who hope with this responsibility to alleviate the economic burden that their own migratory process entails, but who, in any case, do not usually have sufficient expertise for navigation on the high seas.

It also happens that, on occasions, illegal trafficking is limited to payment for a place on a boat, but not for the accompaniment of a skipper, which forces some of the passengers to assume this role, without any knowledge of navigation, as we were told by migrants and aid workers in reception centres:

“In Senegal a lot of young people work, earn money for the boat. The family does not know anything. If a family member knows, you don’t go, you don’t take a boat. I paid 300 EUR leaving from St. Louis.” ... “Just people who, with their work, the employers, pay for the trip. Other people pay some money. We have always heard about one thousand or so EUR, and we have been told that with 300 or 400 EUR you travel, it may seem that it is little money, but getting 50 EUR in Senegal is not like getting it in Spain.”

In addition, the absence of adequate navigation equipment for the crossing (lack of GPS or use of cell phones with little autonomy), the absence or insufficiency of rescue equipment inside the boats or the fowl of a roof to protect

them from inclement weather increases the likelihood of suffering some kind of accident.

Finally, the accident rate is related to the conditions in which immigrants travel. Generally, they have little or no training or familiarization with the marine environment, with the exception of those who work in fishing, so they tend to wear inadequate clothing for the cold, heat or humidity at sea and frequently suffer from seasickness or vomiting derived from the navigation itself. In addition, very often the crossing is made with insufficient water and food provisions, in overcrowded and unsanitary conditions. All this is especially relevant in the case of crossings by pregnant women, babies and children, whose number has increased proportionally in recent years.

#### *Migration policy as a factor*

Beyond the factors related to the migratory event itself, the levels of accidents and mortality that accompany this migratory process are related to the immigration policy that has been developed in Spain during the pandemic. This has focused, as far as border control is concerned, almost exclusively on maritime rescue, border control abroad and the fight against illegal human trafficking, something which is necessary and has undoubtedly contributed to the fact that the figures for accidents have not been even worse, but which is insufficient if the aim is to reduce the level of danger.

Maritime rescue oriented to the migratory flow, as an organized structure, began, in the case of the Canary route, with the arrival of the first small boats at the end of the 20<sup>th</sup> century. Supported by the signing, in 1979, of the International Convention on Maritime Rescue (SAR), which aimed to create an international search and rescue plan regardless of the place where it was necessary to act, and its entry into force in 1985, an organizational structure oriented to the search and rescue of vessels with irregular immigrants was developed. Until the adoption of this agreement, there was no international system for these op-

erations, although the obligation to provide help to ships in distress was regulated by the International Convention for the Safety of Life at Sea (SOLAS). This was supplemented by the United Nations Convention on the Law of the Sea (UNCLOS, 1982), which stipulated that every state shall require the master of a ship flying its flag, whenever they are able to do so without serious danger to the ship, its crew or passengers, to render assistance to any person found in danger of perishing at sea.

According to the SAR Convention, states are obliged to ensure that measures are taken for the creation of adequate search and rescue services in their coastal waters and to enter into agreements with neighbouring countries, establishing international search and rescue regions, involving the joint use of facilities and the establishment of common procedures. In the case of the extensive SAR zone around the Canary Islands, which came to be controlled by Spain, at first the actions were carried out exclusively by the army, but since its creation in 1992, the rescue work has been progressively taken over by the Maritime Safety and Rescue Society (SASEMAR), while the army reserves for itself search actions. In addition to all this, Spanish operatives act with some frequency in other SAR areas when necessary, in accordance with the provision of the International Maritime Organization whereby states must adopt measures to allow the rapid entry into their territorial waters of rescue units from other countries (OMI, 2016).

The importance of search and rescue is evidenced by the fact of the approval of the Resolution of 18 April 2018, by which the European Parliament requested the development of search and rescue capabilities in all states and the recognition of the support provided by private agents and NGOs in rescue actions at sea and on land, and, in the case of the Canary Islands, by the high numbers of migrants who are annually rescued by SASEMAR. Despite all this, the number of shipwrecks, deaths and missing persons has been very high on the Canary Islands maritime route during the pandemic. The con-

stant need for more resources for rescue in the islands, the lack of resources and training in neighbouring countries, and the difficulties for international coordination all contribute to the fact that the results are not better.

Border control has been characterized during the pandemic, as has been the case since the beginning of the century, by the development of own surveillance systems and by its outsourcing to other countries. Spanish surveillance is carried out in the FIR zone (Flight Information Region) around the Canary Islands, but also off the coasts of Mauritania and Senegal, in order to hinder the exit. To this end, Spain has increased its naval and air resources in recent years, with several patrol boats, “*guardamares*” (search and rescue boats), tugboats, helicopters, airplanes and drones (Figure 4). Externalization, that is, the fact that the issuing and transit countries play a fundamental role in preventing irregular migratory movements, has been in place for the last 15 years, since the migratory crisis that occurred in 2006 around the Canary Islands. In return, these states receive economic compensation and trade concessions within a structure of formal bilateral and diplomatic agreements with Spain. Externalization includes the signing of forced readmission agreements with the sending countries and the control of departures and transit, receiving Spanish cooperation in this regard (GABRIELLI, L. 2017).

Finally, the third type of action is collaboration with the authorities and law enforcement agencies of the sending countries to dismantle networks and organized groups engaged in the smuggling of migrants. The smuggling of migrants by sea is a life-threatening crime punishable under both European and international law. In this regard, we just want to say that the European Union and its member states have been contracting parties to the United Nations Convention against Transnational Organized Crime (UNTOC) and its Protocols, including the Protocol against the Smuggling of Migrants by Land, Sea and Air, since 2000 (UN, 2004) and, that based on this international agreement, Spain has developed cooperative action to dismantle these criminal structures (BOE, 2007).

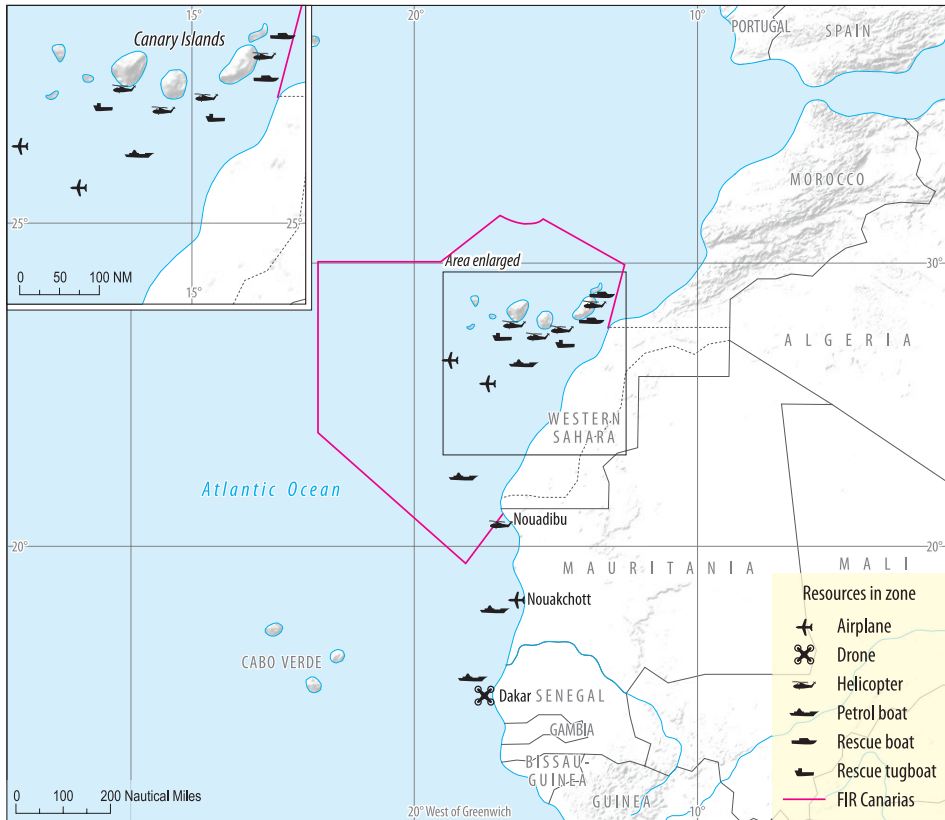


Fig. 4. Spanish FIR area around the Canary Islands and means used. *Source:* [Guardiacivil.es-salvamentomarítimo.es-defensa.com-exteriores.gob](http://Guardiacivil.es-salvamentomarítimo.es-defensa.com-exteriores.gob). Authors' own elaboration.

Therefore, Spanish immigration policy has focused, during the pandemic, on border control through direct surveillance and externalization of borders, police control and humanitarian rescue actions, but has neglected actions aimed at alleviating the effect of the causes that explain the migratory event itself or the regulation and management of the process. This model of action, which leads to a high accident and mortality rate, has led some organizations to describe Spanish immigration policy as “necropolitical” because it assumes the existence of deaths and disappearances as something consubstantial to the intervention model, following the terminology of the philosopher Mbembe, A. (2006).

## Conclusions

The accident rate is an intrinsic characteristic of the maritime migratory model of Northwest Africa, the so-called Canary route, with an increase in the number of migrants killed and missing at sea during 2020 and, especially, in 2021.

Shipwrecks have occurred at all times but have been more frequent in the second half of the year, coinciding with the period when environmental conditions are conducive to navigation. From a demographic point of view, most of the dead and missing are men, although in 2021 the number of women and minors grew.

The incidents have been distributed over a wide geographical area. In some cases, they have been located close to the ports of departure, in others during the crossing, near the island coasts and some at more distant points, due to the drifting of some vessels. Most of the vessels involved in the accidents had departed from the coasts of Western Sahara, especially Dakhla, from the ports of Nouakchott and Nouadhibou in Mauritania, and from Mbour in Senegal. The distance to the destination makes the crossings dangerous and the likelihood of an accident greater. However, other factors relating to the environmental conditions, the characteristics of the vessels and the circumstances in which the passengers are traveling explain the high number of victims.

Behind the accident rate is the way in which migrants are forced to make their ocean crossing, with the frequent involvement of organizations engaged in human smuggling and the difficulties and limitations of law enforcement and search and rescue services to operate more effectively.

But any effective action should consider the causes of the migratory process and, consequently, facilitate an orderly, regular and safe one, complying with the sustainable development objectives approved for 2030 and objective 8 of the Global Compact for Migration. We believe that it is the European Union's own migratory model, applied in Spain, which contributes to the fact that an orderly migratory policy has not been developed for the countries of Northwest Africa. Even in the case of asylum seekers, the results are far from optimal. In 2021 only 10.5 percent of the resolutions were favourable, compared to 35 percent on average in Europe (CEAR, 2022b).

Similarly, the Spanish migration model has not been oriented to solve, at least partially, the causes that provoke irregular migratory flows. A good example of this is that, although Spanish official development aid, which is directed in part to sub-Saharan countries, has grown in recent years, in 2021 it was only 0.26 per cent of GDP, compared to the European average of 0.49 percent and in any case, far from the com-

mitment of 0.7 percent, according to data from the Development Assistance Committee (OECD, 2022). The foreseeable approval of the new Law on Cooperation for Sustainable Development and Global Solidarity may help to remedy this situation, but the above-mentioned precedents lower expectations.

On the other hand, Spanish policy has been based on the externalization of border control. It does not seem to be an effective control system, in view of the flows that occur and the number of deaths and disappearances, and this without taking into account how questioned this system is in terms of the rights of immigrants. Besides, the impermeability of the external borders established in third countries depends on continuous negotiation, which turns irregular immigration into a geopolitical tool or weapon (GARCÉS MASCAREÑAS, B. 2021).

Finally, beyond the factors that explain what has happened on the Canary Island migratory route, it should be noted that the accident rate and loss of life have become a naturalized element of the migratory model, by the authorities and even by Spanish society, when it should instead be a central element that stimulates reflection and debate on the possibility of a different intervention model.

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# International immigration and entrepreneurship in rural areas of the Spanish Pyrenees

CRISTÓBAL MENDOZA<sup>1</sup>

## Abstract

The academic literature on international immigration into rural areas has clearly identified two main international migration flows: retirement migration and low-skilled migration in farming. Yet, the emphasis on these two types of international immigrants has overlooked other types of incomers, such as professionals, lifestyle movers, immigrant entrepreneurs and self-employed workers who may potentially have positive impacts on local rural economies and societies. Filling a gap in the literature, this paper concentrates on immigrant entrepreneurship in the Spanish Pyrenees. In doing so, it explores connections between local economies, entrepreneurship, and lifestyle immigration. It also analyses the potential of immigrant entrepreneurs to contribute to local economic growth with the different types of capital they possess (e.g. human capital, social capital). Methodology, it is based on a fieldwork carried out in the Spanish Pyrenees between February and May 2022. Specifically, it has been carried out 31 in-depth interviews with foreign-born immigrants in two areas of the Spanish Pyrenees (Girona and Huesca). The non-representative sample is equally distributed among immigrant entrepreneurs, self-employed workers, and employees, and it was also balanced by sex and covered different ages, covering, thus, a broad spectrum of immigrants' labour incorporations. Our results add new evidence to previous discussions on immigrant entrepreneurship and lifestyle immigration, from the viewpoint of rural mountain areas. Interviewed immigrant entrepreneurs occasionally play a key role in the creation and introduction of innovative products in very specific market niches in farming and tourism in the Pyrenees. In this way, immigrants stimulate local economies, and help to strengthen values on sustainability, community and sense of place. Yet the companies they create are often limited in both size and capital, and these circumstances generally produce only a slight impact on local economic development and job creation in the Pyrenees.

**Keywords:** immigrant entrepreneurship, rural areas, Spain, lifestyle migration, Pyrenees, mountain areas, local economies

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## Introduction

European rural localities may face depopulation and ageing, which, in turn, might hamper local economies and make the territory more vulnerable to natural hazards and speculation (e.g., HOGGART, K. 1997; CAMARERO RIOJA, L.A. and SERRANO, J.O. 2021). This results in a Catch-22 situation in which the older population may not be able to continue with their previous economic activities, while

no new activities are created because of the emigration of young people. This pessimistic view is somehow counterbalanced by a perspective emphasizing visions of rural localities as offering a high quality of life for urban dwellers after pandemic times, even if this trend may be restricted to well-connected peri-urban areas (FIELDING, T. and ISHIKAWA, Y. 2021; STAWARZ, N. *et al.* 2022). Both views point to the complexity in deciphering the role spatial mobilities play in the future of

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rural places that are traditionally victims of outward migration and a lack of investment in economic and social infrastructure (see, for instance, GONZÁLEZ-LEONARDO, M. *et al.* 2022).

International migration towards rural areas is increasingly present in Europe. Indeed, international immigrants have prevented (or slowed down) depopulation in rural areas (BAYONA-I-CARRASCO, J. and GIL-ALONSO, F. 2013; CAMARERO, L. and SAMPEDRO, R. 2019), and they have played a critical role in agricultural restructuring and economic transformation in rural societies (WOODS, M. 2016), in a time when farming has ceased to be the main source of employment in many European rural economies (BOYLE, P. and HALFACREE, K. 1998). In the move to address demographic challenges and shift from an exclusive reliance on agriculture, several economic activities have taken on a heightened importance by making substantial contributions to the survival of many rural areas (POTTER, C. and BURNEY, J. 2002). Rural municipalities may, in fact, serve as laboratories since we will be able to watch the challenges and opportunities of mobility/migration processes as they unfold (BELL, M. and OSTI, G. 2010). These processes may be familiar in established urban gateways, but relatively new contexts of reception require closer attention in order to propitiate theoretical debates and empirical knowledge (MCAREAVEY, R. and ARGENT, N. 2018). Indeed, international immigration can remain important across Europe as, in the future, some rural communities may have to cope with allocations of different types of immigrants, while others will strive to counter depopulation and decline (MCAREAVEY, R. 2017).

On the European level, the public debate on migration tends to focus on macro-scale policies and solutions, even if the opinions expressed in these debates may be shaped by place-situated, local experiences. Today, small-scale initiatives are making a difference across Europe because communities devise locally produced solutions for immigrants' accommodation (MORÉN-ALEGRET, R. and WLADYKA, D. 2019). Examples of good practice at the local level may be transferred across Europe

and this would be especially valuable in rural municipalities where residents have relatively little historical precedent in formulating responses to immigration. In this context, this paper investigates the role of international immigrants in rural municipalities (less than 2,000 inhabitants) in the Spanish Pyrenees. By analysing patterns of international migration, it makes visible the variety and complexity of immigrant inflows into Spanish rural areas. Furthermore, the paper explores connections between local economies, entrepreneurship and lifestyle immigration by analysing the potential of immigrant entrepreneurs to contribute to local economic growth with the different types of capital they possess (i.e., economic, human and social capitals).

Theoretically, the article is based on the literature in international migration into rural areas, particularly the lifestyle migration which suggests that economic reasons lie well behind personal and family reasons for moving into non-urban areas, and the immigrant entrepreneurship literature which has mainly focused on immigration into cities. It also adds to the debate on the "new ruralities". This paradigm suggests that rural areas lost their main function of farm production and became increasingly transformed into places of consumption and leisure. In other words, in many regions, the countryside has diversified itself in functional terms (MARSDEN, T.K. *et al.* 2003; HRUŠKA, V. and PŘÍŠA, J. 2019). Furthermore, and in line with the objectives of this article, WOODS, M. (2016) highlights the potential of international migration to reshape ruralities with increasing transformational impacts and boosting rural economic growth, as some migrants have the potential to contribute to local economies with their skills, training, connections and, at times, their entrepreneurship.

The paper is structured as follows. The next section theoretically analyses international immigration trends in rural settings, as well as demonstrating how links between entrepreneurship and lifestyle immigration are rarely studied in the academic literature. Subsequently the methodology used in the re-

search project, upon which this paper is based, is presented. Later, the paper goes on to show the research results. These are organized in two sections: the first revolves around the patterns of international migration observed in the rural municipalities of the Pyrenees and the second focuses on immigrant entrepreneurship. Finally, some conclusions and reflections for further research are offered.

### **Theoretical background: immigration into rural areas**

The arrival of international immigrants in European rural areas has increasingly been addressed in the literature (i.e., BOYLE, P. and HALFACREE, K. 1998; JENTSCH, B. and SIMARD, M. 2009). The academic literature has long identified the key role of international immigrants, mainly from developing countries, in European farming (for a recent review on the topic, see RYE, J.F. and SCOTT, S. 2018). In the specific case of Southern Europe, international labour migration is particularly relevant for agriculture which is dominated by family-based small farms (PEDREÑO, A. *et al.* 2014; CORRADO, A. *et al.* 2017; PAPADOPOULOS, A.G. *et al.* 2018).

The literature has also extensively addressed retirement migration (primarily retired nationals from developed countries heading to less expensive nations). In Southern Europe, the literature has long pointed out the preference of Northern and Central European retirees for coastal destinations with a benign climate and a history of seaside tourism (e.g., the Spanish Costa del Sol, the Portuguese Algarve) and rural “idyllic” settings of beautiful countryside with a supposedly laid-back lifestyle (e.g., Southern France, Italian Tuscany; see KING, R. *et al.* 2019; ROMAGOSA, F. *et al.* 2020). This migration has been potentiated by an increase in geographic mobility, longer healthy lifespans and more people pursuing active lifestyles through migration to countries perceived as scenically, climatically and culturally attractive (KING, R. *et al.* 2000; HUETE, R. *et al.* 2013).

The emphasis on these two specific types of international migrants into rural areas has

overlooked other types of incomers, such as professionals (including doctors and nurses, who are crucial in post-COVID times), lifestyle movers (some of whom move to rural areas from urban settings maybe perceived as unhealthy and dangerous in a pandemic crisis), immigrant entrepreneurs and self-employed workers who may potentially have positive impacts on local economies. Indeed, immigrants have not only been shown to fill gaps in rural labour markets, but they have a great potential to contribute to economic growth with their skills, training, international connections and, at times, their entrepreneurship.

### *Lifestyle immigration and entrepreneurship*

Rural areas are very attractive for lifestyle immigrants who change residence, often internationally, in their search for a more fulfilling way of living (BENSON, M. and O'REILLY, K. 2009; KORDEL, S. and POHLE, P. 2018). Lifestyle immigrants have been defined as “relatively affluent individuals, moving either part-time or full-time, permanently or temporarily, to places which, for various reasons, signify for the migrants something loosely defined as quality of life” (BENSON, M. and O'REILLY, K. 2009, 621). Thus, migration is seen as constituting a part of life's trajectory, whereby destinations are chosen according to how incomers believe their life objectives could be matched (HOEY, B. 2005; BENSON, M. and OSBALDISTON, N. 2014). In this sense, migration might show more similarities with elite circularity and mobility than with other more traditional forms of migration such as labour migration (IBRAHIM, Z. and TREMBLAY, R. 2017).

In many cases, international immigrants prefer not to be employees and often opt for self-employment activities, in order to maintain an acceptable balance between the personal and work spheres in their new life (STONE, I. and STUBBS, C. 2007; CARSON, D.A. *et al.* 2018). Yet their companies are often limited in both size and capital, maybe out of fear that an excessively successful business could disrupt their ideal work-life balance (BENSON, M. and

O'REILLY, K. 2009). It has been found that the entrepreneurial activities developed by these immigrants are usually not related to previous careers, perhaps due to a break with their past (HOEY, B. 2005). These circumstances produce only a slight impact on local economic development and job creation (CARSON, D.A. *et al.* 2016). In fact, it has been pointed out that such entrepreneurs lack a future business strategy and are reluctant to employ workers beyond family and close friends (MÜLLER, D.K. and JANSSON, B. 2007). Among the elderly, processes of reintegration into the labour market have been observed in the countries of destination after retirement (EIMERMANN, M. and KORDEL, S. 2018).

However, some European case studies have observed that immigrant entrepreneurs have played a key role in the creation and introduction of innovative products in very specific market niches that had been little explored in rural areas, thus, stimulating local economies and helping to strengthen values related to sustainability, community and sense of place (YEASMIN, N. 2016; MUNKEJORD, M.C. 2017). These studies suggest that immigrants show a different sensitivity when it comes to valuing local, cultural and landscape resources, which, in fact, may be the reason for their arrival in the "countryside" (BARTOŠ, M. *et al.* 2009; IVERSEN, I. and JACOBSEN, J.K.S. 2017). They would, thus, have the potential to imagine local culture, landscape and nature as possible tourism products, as well as recognizing business opportunities that locally born inhabitants might overlook (BOSWORTH, G. and FARRELL, H. 2011; MATTSSON, K.T. and CASSEL, S.H. 2019).

In fact, the rural environment could become an innovative environment in which small businesses could eventually thrive (STATHOPOULOU, S. *et al.* 2004; GARCÍA MARCHANTE, J.S. *et al.* 2007), and the initiatives of immigrant entrepreneurs, perhaps innovative with respect to culture and nature, could translate into tourism products or brands (CARSON, D.A. *et al.* 2018; MATTSSON, K.T. and CASSEL, S.H. 2019). The literature on lifestyle migration has also pointed out that

immigrant entrepreneurs have the potential to establish networks between their former countries of origin and their new destinations (STAM, E. 2010; CARSON, D.A. *et al.* 2016), which would be in line with the "culturalist approach" in ethnic entrepreneurship studies. This approach highlights the role of networks forged within the immigrant communities in cities for understanding patterns of entrepreneurship, whereby access to social networks is related to "ethnic" solidarity, based, in turn, on expectations of mutual support among its members who share common cultural traits (RATH, J. and KLOOSTERMAN, R. 2000; SOMMER, E. and GAMPER, M. 2018). However, the capacity of immigrant entrepreneurs to create networks and social relationships in rural host societies has barely been addressed in the literature (KANAS, A. *et al.* 2011).

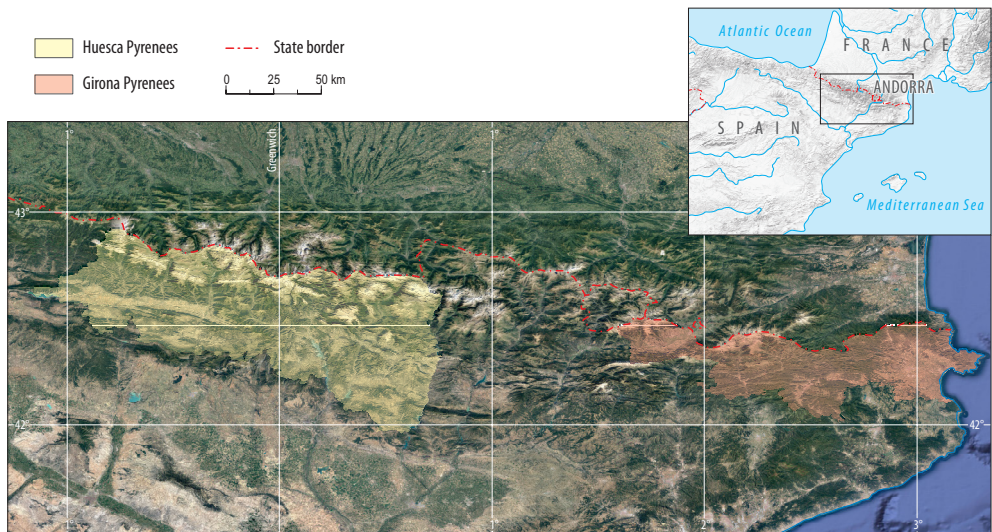
Moreover, the extensive literature on immigrant entrepreneurship in urban areas has often underestimated the role of human capital with respect to business (LEY, D. 2006; AMBROSINI, M. 2012). This is probably because education and work experience prior to migration might be considered of low quality and difficult to transfer to destination countries (CHISWICK, B.R. and MILLER, P.W. 2009), even though the possession of skills, work experience and other useful assets facilitates self-employment (see, for instance, LI, P.S. 2001; CONSTANT, A. and ZIMMERMANN, K.F. 2006). Furthermore, several studies show that educational level and training courses help entrepreneurs to manage their businesses and achieve economic success (e.g., KIM, Y.D. 2006; VALDEZ, Z. 2008). Other authors, in contrast, argue that education and work experience might decrease the likelihood of being self-employed, suggesting that self-employment is a survival strategy born out of necessity (ALIAGA-ISLA, R and RIALP, Á. 2013; BRZOWSKI, J. *et al.* 2017). This does not seem the case, however, with immigrant entrepreneurs in European rural areas, mainly from other European Union countries, who, in many cases, pursue business as a means to a more fulfilling life (EIMERMANN, M. and KORDEL, S. 2018; MENDOZA, C. *et al.* 2020).

## Methodology

This article is based on the EU-funded research project titled SURDIM (Sustainable Rural Development and International Immigration in the Pyrenees). This project analyses international immigration in the rural municipalities of the Pyrenees. It specifically studies labour immigrant pathways in both the French and Spanish Pyrenees to identify sustainable economic projects managed and/or supported by immigrants and present successful experiences concerning rural development. This project aims to contribute to improving territorial relations and integration in rural territories.

The methodology of the project consisted in multi-sited research that relies mainly on qualitative methods applied to carefully pre-selected case studies. Even if the project is binational, this article specifically focuses on the Spanish Pyrenees. Specifically, the fieldwork was carried out in rural municipalities (less than 2,000 inhabitants) of Girona (Alt Empordà, Ripollès and Cerdanya counties) and Huesca provinces (Ribagorza and Sobrarbe counties) between February and May 2022 (*Figure 1*).

A total of 31 in-depth interviews with foreign-born immigrants were undertaken in two study areas. Interviewees were selected through a snowballing technique. In the first place, local contacts from the public administration and entrepreneurial associations help identify foreign-born immigrants in the area. Subsequently, previously interviewed immigrants provided us with information of other possible research participants. Due to several ways of access, potential bias was prevented. Interviews were structured along three main dimensions – economic, social and environmental. Although the research did not attempt to achieve a representative sample, it is equally distributed between immigrant entrepreneurs, self-employed workers and employees. Immigrants are heterogeneous concerning their country of birth, being those coming from other European Union countries a majority. We tried also that informants were balanced by sex, even if women outnumbered men in the non-representative survey, and covered different ages, resulting in a broad spectrum of immigrants' labour incorporations. Finally, those selected for this research has lived in the Pyrenees for at least one year (*Table 1*).



*Fig. 1.* Study areas inside the Spanish part of the Pyrenees

Table 1. Profile of the interviewed foreign-born immigrants in the Spanish Pyrenees (N = 31)

Indicators		Persons
Province of residence	Girona	16
	Huesca	15
Sex	Women	20
	Men	11
Country of birth	Netherlands	6
	France	4
	Italy	3
	Argentina	3
	Great Britain	2
	Peru	2
	Other EU*	5
	Other Latin America**	4
Age at interview, year	Rest of the world***	2
	30–34	2
	35–39	2
	40–44	8
	45–49	3
	50–54	6
	55–59	2
	60–64	4
65 and more	4	
Year of arrival in Spain	Before 2000	7
	2000–2004	8
	2005–2009	5
	2010–2014	5
	2015–2021	6
Professional status	Entrepreneurs	12
	Self-employed workers	10
	Employees	9
Current legal status	Spanish passport	5
	Other EU passports	18
	Residence and work permits	8

\*Belgium, Bulgaria, Czech Republic, Germany, Romania. \*\*Brazil, Colombia, Mexico, Venezuela. \*\*\*Cameroon, India. *Source:* Fieldwork, February–May 2022.

The immigrants' information is complemented by material from 12 semi-structured interviews with key informants (i.e., local mayors and business associations in the Pyrenees). In both cases – immigrants and key informants –, the interviews had an average length of approximately one hour and they were carried out at the time and place of the interviewee's choice. All the interviews were recorded and fully transcribed. Finally, participants were assured that the collected data would be anonymized.

Interview data were analysed through a content analysis method. This has several phases. First, the codes were defined and

classified, according to the interview sections. Second, using free MAXQDA software, the interviews were labelled, and extracts were grouped into different topics. Finally, a systematic reading and analysis of this information enabled abstracting and the selection of relevant quotations to illustrate the main lines of analysis.

### **Mobility and migration patterns in rural Spanish Pyrenees**

A change in lifestyle comes to the forefront of many of the interviewees' narratives, as a

primary reason for immigration to the Pyrenees, in line with the lifestyle migration literature (e.g., BENSON, M. and O'REILLY, K. 2009; KORDEL, S. and POHLE, P. 2018). In a quest for a better way of life, immigration seems built upon “place idealisation” (BENSON, M. and OSBALDISTON, N. 2014) and preconceived images of the “idyllic rural” (HOGGART, K. and BULLER, H. 1995; BOYLE, P. and HALFACREE, K. 1998). Yet adjustment to a new life is not always an easy process since immigrants in rural Pyrenees occasionally lack an appropriate awareness of the territory and, for those in an entrepreneurial activity, a pertinent knowledge of how to do business in a rural setting. The following opinion reflects this duality – the interest in life changes and the difficulties of starting a new project in an unknown territory.

It was not easy to find a place for the campsite (...). We left everything behind in the Netherlands back in the 1990s, and our budget was limited. We wanted a small campsite, and this valley was just perfect. We had to practically rebuild the house and the idea of a small campsite was hard to implement. Rules are thought out for big facilities with many amenities, and this is an alternative campsite in a very small, remote place. It's hard to get here. If you want to get lost, you're in the right place. We are 100 percent sustainable (solar panels, waste) and our customers look forward to it (Jan<sup>2</sup>, Dutch male, 67, Girona).

Jan and his wife decided together to move to rural Catalonia – a radical change that involved leaving behind a stressful life in the Netherlands. For the majority of those contacted for the project, the migration decision process was not an individual act (in line with lifestyle migration) but rather the result of household considerations (see also KORDEL, S. and POHLE, P. 2018). This is also the case for the following interviewees who opted to migrate to Huesca, after years of working temporarily in the area as rafting instructors.

I arrived here to this village straight from Argentina. My first trip to Europe was here, because I am a rafting instructor. Rafting is my life. I came here with my boyfriend, now my husband, also a rafting instructor (...). I fell in love with the village because

of the mountains, the river. We came for eight years, only for the rafting season. We were entrepreneurs in Argentina. We made lifesaving vests for rafting (...). We had a severe personal problem in Argentina and we decided to settle here and replicate the business in Spain. My husband also has Italian nationality and that made things easier, but the whole business was not that easy. The rules are quite different (Alicia, Argentinian woman, 32, Huesca).

Alicia explained that her relationship with the study area began prior to the final decision to migrate, and a personal problem pushed her and her husband into changing their residence to a small town in the Pyrenees. This pattern is frequently found in the interviewees. For instance, Louis knew the municipality and the house to which he and his family moved, since it was his in-laws' second home. In this case, the COVID crisis pushed them into leaving Barcelona and immigrating into the Pyrenees.

I live in Cerdanya, but I could live anywhere. I work remotely for a French company as a self-employed worker. This is a solid business relationship. The reason why we live here? We ran away from Barcelona in the COVID times, and my wife's family has a house in (small town). In the future we want to buy our own house, and we will probably move to Southern France, which is cheaper (Louis, French male, 53, Girona).

Even if Louis said in interview “I could live anywhere”, the decision of moving into the Pyrenees implied family arrangements, such as children's schooling. As it can be seen in previous interview extracts, the migration decision was made by the family, regardless of the reason for moving to the Pyrenees (a personal problem, a change of life, COVID). Indeed, there are few individual labour migration trajectories in our non-representative survey (i.e., individuals immigrating into the area for purely labour-related reasons). Work usually comes after the decision to migrate into the area is made. In any case, it does not seem that the employed interviewees have struggled for jobs in the Pyrenees. This is the case of Xóchitl, a Mexican national, who took the decision to migrate into the Huesca Pyrenees because of his partner, even if this provoked downward labour mobility.

<sup>2</sup> All the names are pseudonyms.

I left everything for love (...). I started doing cleaning. I cleaned schools, I did cleaning for a company. I got to have up to four different jobs (...). I began to see what panorama I had, and I was told: "Here people are needed for caring old people". I studied the socio-sanitary course, which is offered by the county for free. Later, I joined a private company that specializes in providing care services in the area. They offered me a bad wage, not paying me extra time. It didn't suit me. I left it and, in June 2018, I started working in a private residence (Xóchitl, Mexican female, 50, Huesca).

A bottom line of all the interviews is housing. Since social life might be limited in rural areas, a private comfortable space for living is almost a necessity. Some interviewees argue that housing was the reason for them to live in a specific municipality/county. In other words, once the choice of the region is made (mountain areas/Pyrenees), the specific place becomes somehow irrelevant. Furthermore, housing is mentioned as the main problem in the area, which has a systemic lack of apartments for rent, due to the great competition from tourist activities and second homes in the housing market. This is especially true in the ski season and the high summer season. As one interviewed mayor said to us: "We just need a better train connection and more public housing. That's it".

Several general points emerge from the interviews. The first relates to lifestyle immigration, which is not only triggered by the desire to escape the fast pace of urban life but also represents a search for self-realization and a change in the way of life (BENSON, M. and O'REILLY, K. 2016). The narratives introduce the idea of well-being and nature as important elements for interviewees living in the Pyrenees. They generally appreciated the advantages of residing in a rural setting and no-one mentioned a possibility of moving out of the region soon. The second point is the complexity of patterns of mobility/migration in the area. Some of the interviewees were already living in Spain and moved into the Pyrenees for various reasons (e.g., tranquillity, house availability, COVID), and others immigrated straight from outside Spain to the area, as their first destination in the country. In both cases, they might have

known the region as tourists before settling there. In relation to this, the third point is that international migration into the Pyrenees is a household decision. Few interviewees decided to embark on the mountain adventure on their own. Most of them took this initiative either jointly with her/his partner or due to a Spanish spouse (or relatives) originally from the area (see also KORDEL, S. and POHLE, P. 2018). The fourth point is the housing market, which is a real problem in the area (and specially for immigrant workers) because of the intense competition derived from tourism activities and second homes. In any case, the specific choice of a municipality generally depends on the availability of affordable houses for international immigrants. Finally, labour markets in rural areas of the Spanish Pyrenees are dynamic, with a high demand for employees in different economic sectors and a large potential for possible entrepreneurs to create business. In this regard, some interviewees see the potential directly connected to landscape and mountain activities and show a special sensibility to environmental issues (see also CARSON, D.A. *et al.* 2018; MATTSSON, K.T. and CASSEL, S.H. 2019). This will be developed in the next section.

### **Economic incorporation: immigrant entrepreneurship**

The last section analysed reasons for immigration into the Pyrenees and showed the diversity of migration patterns in the area. Here, we specifically focus on the entrepreneurship of the new residents, particularly their capacity for setting up and expanding businesses. The bottom line is that immigrant entrepreneurs might possess different types of capital (i.e., economic, human and social capitals) which may be an advantage in labour markets, compared to their local Spanish-born counterparts (see also Woods, M. 2016).

Most of the entrepreneurs and self-employed workers interviewed for this project in Spain were born in Central and Western Europe: in Girona, out of the 16 interviewees,

11 were employers and self-employed workers (9 Europeans and 2 Latin Americans), and in Huesca, out of 15, the 10 employers and self-employed workers were, in general, originally from other European countries (7 out of 10, with the 3 remaining originally from Latin America). This initially implies that the interviewees were strong financially on arrival, but, after analysing their narratives, *economic capital* does not play a relevant role in the survival of businesses. In fact, these tend to be family run, small in size and usually have no employees (see also HOEY, B. 2005; MÜLLER, D.K. and JANSSON, B. 2007; BENSON, M. and O'REILLY, K. 2009; CARSON, D.A. and CARSON, D.B. 2018). To illustrate this point, Lena, a young Dutch farm employer who decided to live in a small town in the Pyrenees with her partner, also Dutch, said in her interview:

We had few savings. The truth is we bought the lands and the house through crowdfunding (...). I also got public assistance for being a young employer. In the beginning, we didn't hire anyone. For the grape harvest, friends of ours came here and helped us in exchange for food and accommodation (...). Now the business is growing, and we are thinking of permanently hiring a worker to help us on the property (Lena, Dutch female, 32, Girona).

The following example comes from Michel, a retired Frenchman who inherited land from his family. He said in his interview that he was not interested in business itself but was committed to the recovery of a traditional crop (saffron) that had been abandoned in the region. Michel decided to leave France permanently and reside in a small village in the Huesca Pyrenees. "I could live on my pension, but the idea of the saffron, and the idea of teaching young farmers about it, seduced me. It is more of a romantic idea. I love this region. But the truth is that I lose money". This is line with previous lifestyle literature which stresses wellbeing rather than economic profitability in business (YEASMIN, N. 2016; CARSON, D.A. *et al.* 2018).

As regards *human capital*, all the interviewed entrepreneurs had a tertiary educa-

tion and they are fluent in several languages, which is a competitive advantage, particularly for those working in the education field (see also MENDOZA, C. *et al.* 2020). This was the case with the following British interviewee, who created an English academy in a rural town in the Girona Pyrenees.

I was employed in a language school in Figueres but the jobs were temporary (...). I had to look for another similar job which meant continuing to be an employee, and I thought that maybe it would be interesting to start my own business, to be self-employed, so I'd have more control over my work (...). I knew there were lots of children, a great demand for English classes, and so I decided to open the English academy (...). I don't think it's that easy to be self-employed in Spain. My impression was there were several obstacles to jump over rather than open doors (...). I didn't apply for any help from the government during the COVID crisis, because I didn't know how to get these funds. In fact, we received financial support from our families in Britain (Steve, British male, 44, Girona).

University education and previous training are crucial for understanding interviewees' professional success, but, in business terms, previous human capital is only partially helpful. The preceding interview extract mentioned the difficulties in creating the academy and the lack of knowledge about the COVID aids made available by the Spanish administration. In this regard, half of the employers and self-employed workers started a business for their first time in their lives in the Pyrenees (and the other half were usually involved in entrepreneurial activities not related to their previous experience, see also HOEY, B. 2005).

On the other hand, interviewees' human capital might lead to a special appreciation of landscape and nature, which, in turn, could translate into innovative products (see also CARSON, D.A. *et al.* 2016; MATTSSON, K.T. and CASSEL, S.H. 2019). The following example comes from Márcia, a Brazilian-born university professor who embark into theatre with her Spanish partner, after partially retiring. They are both self-employed workers and, with other foreign-born people, they recovered an abandoned village in the Huesca Pyrenees, as a collective project. In her words:

My husband is from the region. We had the idea of buying a house, also for being closer to his parents. He has been living outside Spain for many years. The idea was to come to live here when I retired in Brazil. We bought a ruined house; the whole village was abandoned (...). We built an open-air puppet theatre in the house. It is very cute, and there is a fantastic view of the mountains (...). Most of my neighbours are foreigners. There is a Dutch guy, a Japanese girl, a Mexican who lives here for only part of the year. There is a person from Paraguay, and me (Márcia, Brazilian female, 62, Huesca).

Finally, as for *social capital*, the strongest competitive advantage amongst immigrant entrepreneurs seems to be their capacity to create and expand social networks. The literature has long pointed out the relevance of networks from the country of origin for the creation of businesses by immigrants (e.g., STAM, E. 2010; CARSON, D.A. *et al.* 2016). For example, this was particularly relevant for Johanna, since her small campsite is mainly aimed at Dutch people, with publicity and marketing undertaken in the Netherlands.

This is a special campsite. It is not for everyone. It is for people who want to get total disconnection. You're in Nature (...). We have a very basic tapas bar for dinner, but this is basically do-it-yourself. The Dutch prefer this kind of campsite, and they are almost 90 percent of our customers (Johanna, Dutch female, 60, Girona).

Yet networks are not only based on international bonds, but also on networks drawn from local society: their social networks are built/expanded via an array of informal and formal channels, which may be enhanced by their status as "welcomed" foreigners in areas suffering from chronic problems of depopulation and economic stagnation (EIMERMANN, M. and KORDEL, S. 2018; MENDOZA, C. *et al.* 2020). This "positive stereotype" may have a clear impact for some immigrant entrepreneurs, as regards making relevant contacts within the local economy, particularly in areas with a long tradition of tourism. In this respect, for most interviewees, business, friendship and social life go hand in hand, and this is something to take into consideration when moving into (and

staying in) Spain, as seen in the literature on lifestyle immigrants (e.g., BENSON, M. and OSBALDISTON, N. 2014; ROMAGOSA, F. *et al.* 2020). The point to stress here is that interviewees use social networks and relationships not only to be successful in business but also to achieve lifestyle objectives.

## Conclusions

Our results show that patterns of international migration into the Pyrenees are diverse, in the sense that arrival into the mountain region might derive from a decision by immigrants already living in Spain and willing to move home to a more salubrious region, or they may immigrate straight from outside Spain, with the area as their first destination in the country. In both cases, new residents might have known the territory beforehand as tourists. Diversity is also seen in the variety of immigrants' incorporations into the labour market, from the health sector to cultural-oriented services. This points to very dynamic rural labour markets in the Pyrenees region. There is also a common pattern among the interviewees: immigration into the Pyrenees is a household decision, generally motivated by the desire to escape the fast pace of urban life, in a search for self-realization and a higher quality of life (see also BENSON, M. and O'REILLY, K. 2016; CARSON, D.A. *et al.* 2018; KORDEL, S. and POHLE, P. 2018).

We find also that the interviewed immigrant entrepreneurs – who are mainly highly skilled Northern and Central European immigrants – usually fit themselves into the economic sectors dominant in the area (farming and tourist-oriented activities). Their success partially relies on the variety of capital they possess, including human capital, and their capacities for creating local, regional, and transnational social networks (see also EIMERMANN, M. and KORDEL, S. 2018; MENDOZA, C. *et al.* 2020), even if their businesses are often reduced in both size and capital, without any employees in most

cases (see also BENSON, M. and O'REILLY, K. 2009). The interviews ultimately indicate that physically rooted social networks and relationships (and, more broadly, social incorporations) are not only key aspects for the development of businesses in the area but also provide a source of wellbeing.

Our results add new evidence to previous discussions on immigrant entrepreneurship and lifestyle immigration, from the viewpoint of rural mountain areas. The interviewed immigrant entrepreneurs occasionally play a key role in the creation and introduction of innovative products in very specific market niches that had been little explored in rural areas (see also YEASMIN, N. 2016; MUNKEJORD, M.C. 2017). The examples of Márcia (a Brazilian national working on cultural activities in a previously abandoned locality) and Michel (a retired French who has recovered the saffron production on a very scarcely inhabited hamlet) are good examples of this. Our study case clearly indicates that immigrants show sensitivity when it comes to valuing local, cultural and landscape resources, which, in fact, are sometimes the reason for their arrival in the "countryside" (see also BARTOŠ, M. *et al.* 2009; IVERSEN, I. and JACOBSEN, J.K.S. 2017). In this way, immigrants stimulate local economies, and help to strengthen values on sustainability, community and sense of place. Certainly, the initiatives of the interviewed immigrant entrepreneurs are translated into successful businesses (see also CARSON, D.A. *et al.* 2018; MATSSON, K.T. and CASSEL, S.H. 2019), but, in line with MÜLLER, D.K. and JANSSON, B. (2007), and CARSON, D.A. *et al.* (2016), their companies are often limited in both size and capital, and these circumstances generally produce only a slight impact on local economic development and job creation in the Pyrenees.

Our results suggest that the rural environment could become an innovative environment in which small businesses could eventually thrive (see also STATHOPOULOU, S. *et al.* 2004; GARCÍA MARCHANTE, J.S. *et al.* 2007). Yet, there are still questions to be answered

about the innovative aspects of companies created by immigrants, and certainly more research needs to be done in the region to explore the territory's capacity to develop business. In this regard, no substantial differences were observed between the two Spanish study regions of Girona and Huesca. When a comparison is made between regions of France and Spain, differences may be observed in immigrants' economic incorporation. This will be explored subsequently in the SURDIM project which also foresees conducting research in the French Pyrenees.

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## International student mobility to non-traditional destination countries: evidence from a host country

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### Abstract

Since the early 1990s, Latvia has experienced high levels of emigration. Still, current dynamics show that net migration has nearly ceased and that a growing share of new immigrant populations are from non-European countries. One of the leading causes of a sizable share of recent immigration is the globalisation of higher education and the mobility of international students. However, in recent decades, international student mobility (ISM) has brought attention to various aspects of higher education, educational export, and migration trends. This has captured the interest of academics and practitioners worldwide. Receiving countries recognise the importance of attracting international students as potential residents, especially as they undergo unfavourable demographic changes. The paper aims to present empirical evidence on ISM in Latvia by assessing international student daily life and study experiences. The focus is on examining the perspective of a host country. The study utilises statistical data, survey data and a case study of the University of Latvia to analyse the link between the origin of the student and their choosing Latvia as a non-traditional destination for quality higher education. The findings indicate that Latvia is an attractive destination for young migrants from diverse geographies, including Europe and Southeast Asia and consistent flows of students from former Soviet countries. One of the main factors that draw international students to Latvia is the affordability of education offered in English, providing a “second chance” for achieving success and specific clusters of degree students from European countries studying medicine.

**Keywords:** international student mobility, mobile students, destination choice, Latvia

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### Introduction

Since the early 1990s, Latvia has experienced high levels of emigration. At the same time, the most recent dynamics reveal net migration close to zero and an increasing proportion of the emergent immigrant populations originating from non-European countries. The globalisation and internationalisation of higher education and international student mobility are key drivers for a significant portion of recent immigration. International student mobility (ISM) has raised public awareness of various topics in recent decades, such as the export of higher education, high-

skilled migration, global talent. Attracting potential residents is crucial from the perspective of the receiving nations. This is especially appealing to nations experiencing negative demographic changes. The degree to which a migrant can integrate into the different local systems will also determine how much of an impact they have on their local community.

A significant portion of migration research is influenced by the neoclassical viewpoint, which posits that push and pull factors are crucial in shaping student decisions regarding international student mobility (ISM) (RAGHURAM, P. 2013). The neoclassical perspective suggests that students are driven to

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study abroad due to the push factors in their home countries, such as limited educational opportunities or economic challenges, as well as the pull factors of better educational prospects and improved living conditions in the destination country (RAGHURAM, P. 2013). While analysing push and pull factors has a legitimate role in understanding student mobility, it is vital to approach it cautiously. WELLS, A. highlights the need to handle push and pull factors in ISM research carefully. Cultural, social, and personal aspects can also significantly influence student decisions, and an exclusive focus on economic and educational factors may oversimplify the complexity of student mobility choices (WELLS, A. 2014).

According to institutionally centred analytical frameworks, university systems and other institutions of higher learning have a significant role in influencing and securing student mobility. Available conceptual frameworks frequently consider how a person decides to pursue higher education abroad, their reasons for doing so, and their experiences as international students (FINDLAY, A.M. 2011; VAN MOL, C. and TIMMERMAN, C. 2013; FINDLAY, A. *et al.* 2018). Examining how universities attract international students, provide resources and support services, and offer educational programmes that appeal to international students are examples (FINDLAY, A.M. 2011; VAN MOL, C. and TIMMERMAN, C. 2013). Overall, student mobility abroad can give them worthwhile experiences and long-term advantages. As a result, institutions must value student mobility and help individuals who want to take advantage of overseas study opportunities.

All factors are the desire to go abroad, learn a new culture, and improve language abilities. The desire to receive an outstanding education, increased employment chances, and the availability of more courses are all examples of pull forces. After deciding to study abroad, the student should consider the chosen location's numerous aspects, including the cost of living, the ease of obtaining a visa, the standard of instruction, and safety.

In the decision-making process, both student-centred and institution-centred approach is vital. The decision-making process, motives, and experiences of the person as an overseas student are considered from a student-centred approach. After carefully considering these elements, the student can choose particular options, such as a university and course.

Students are attracted to study abroad by external forces from their home countries (MAZZAROL, T. and SOUTAR, G. 2002). Greater educational possibilities and quality compared to their home country, a better opportunity to learn a foreign language, the desire to live abroad and experience a new culture, access to better work chances, and exposure to other cultures is the main draw factors for international students. The reputation and acceptance of a nation on the global stage, as well as the accessibility of social services and support for students, are other factors that drive students to a foreign country. With this experience, students may have a rare chance to explore a foreign culture, expand their worldwide network, and gain an essential global perspective while studying abroad (LULLE, A. and BUZINSKA, L. 2017). Studying abroad can be an excellent opportunity to gain new skills and experiences, however, it is vital to consider the financial, cultural and emotional costs of studying abroad. Global citizenship and enhanced cross-cultural understanding are only two of the countless advantages of international student mobility. Additionally, mobile students are exposed to many educational techniques and have access to beneficial resources and research opportunities, so they are more likely to succeed academically (BRYŁA, P. 2019). More student mobility can result in better personal growth since it exposes students to other cultures, helps them establish friends, and boosts their confidence (RYE, S.A. 2014).

The cost of studying abroad, which includes tuition fees, housing costs, and living expenditures, must be considered by students. Exchange rates and foreign money might increase studying abroad costs (LULLE,

A. and BUZINSKA, L. 2017). This might be a significant barrier for students who need more resources to pay for the expenses of studying abroad. Language and cultural difficulties can also be significant obstacles for overseas students. Getting used to new languages, cultures, and surroundings can be challenging (LULLE, A. and BUZINSKA, L. 2017). The emotional cost of studying abroad and any stress from being so distant from home must also be considered.

The paper aims to present empirical evidence on ISM in Latvia by assessing international student daily life and study experiences. The paper's first section reviews recent literature on ISM by outlining the theoretical framework, followed by current ISM dynamics in Latvia. The result section outlines the decision-making preferences of Latvia as a study destination in Europe among geographically various student groups. Finally, it exemplifies the case study of the University of Latvia.

## Literature review

Most studies on international student mobility (ISM) have predominantly used quantitative methods to explore its drivers and impacts. However, recent research has started to employ qualitative methods to uncover the complexities of student mobility, such as the lived experiences of international students and the development of transnational networks (FINDLAY, A.M. *et al.* 2012).

The research on ISM has identified various push and pull factors, including personal, societal, and economic influences on the decision to pursue a degree overseas. Previous studies have emphasised the role of institutional and political policies in shaping the internationalisation of higher education and the potential effects of ISM on sending and receiving nations. YANG, P. (2022) highlights the importance of these factors. The perspectives of different organisations, institutions, and individuals involved in the institutional structure of ISM have made it challenging for academics and policymakers to under-

stand student mobility. WELLS, A. (2014) and GÜMÜŞ, S. *et al.* (2020) discuss the difficulties arising from these diverse perspectives.

The push and pull theory help to understand study abroad decisions by considering socioeconomic, cultural, and political environments in both the home and destination countries. The social-demand theory emphasises push factors like escaping poverty and violence and seeking better educational opportunities. In contrast, the supply-side theory focuses on pull factors like the quality of host institutions, research facilities, and the chance to gain international exposure and experience. Cultural considerations, such as the desire for cultural exchange and language acquisition, also influence the decision to study abroad (FINDLAY, A.M. 2011).

Regarding individual and broader societal factors, FINDLAY, A.M. (2011) presents a comprehensive methodology for comprehending the complexities of international student mobility. This approach has been applied in numerous empirical investigations, proving valuable in understanding international students' diverse motivations and decisions (JIANI, M.A. 2017).

LI, M. and BRAY, M. (2007) further explore the concept of "reverse push and pull variables", which suggests that students engaged in internationalisation may experience a form of "push" from their home countries. Examples of such variables include pressure from family or friends to return home and a lack of support while travelling abroad. Despite the attractive factors of the host country, these variables can induce feelings of homesickness and increase the likelihood of students returning to their home countries.

Consequently, it is imperative to consider both push and pull factors when attempting to comprehend the motivations and experiences of international students (WELLS, A. 2014). Pull factors predominantly revolve around the favourable aspects of a destination, such as its academic prestige or quality of life. Examples of pull factors in international student migration include the opportunity to pursue higher education overseas,

access to a superior educational system, employment prospects, and exposure to a different culture and language.

Pull factors are associated with the desirability of the host country (MAZZAROL, T. and SOUTAR, G. 2002). The primary pull factors encompass the quality of higher education, the potential for enhanced employment prospects, the opportunity to acquire valuable skills and knowledge, the potential for higher salaries, and the experience of residing in a novel cultural setting. Studying abroad affords individuals access to esteemed universities and advanced research facilities, a more diverse student population, and other opportunities unavailable to those who remain in their home country. Furthermore, it allows students to develop a global perspective, acquire proficiency in a second language, and immerse themselves in a new culture (REDDY, J.K. *et al.* 2017).

On the other hand, push factors entail limited employment opportunities, insufficient access to education, inadequate infrastructure, and political instability. Other push factors may encompass the aspiration to evade oppressive social and political systems or to seek economic prospects abroad. In recent years, scholarly investigations concerning international student migration have advanced to encompass a more nuanced comprehension of the phenomenon, acknowledging the intricate interplay between push and pull factors. Research has revealed that migration motivations often originate from multiple sources and are influenced by various individual, social, and economic factors.

The choice of destination is a complex decision involving multiple considerations, including potential educational opportunities, economic and social considerations, cost of living, social connections, and geographic proximity (FINDLAY, A.M. 2011; HU, C. *et al.* 2016; JIANI, M.A. 2017; FINDLAY, A. *et al.* 2018). Access to quality education, economic security, and availability of social networks are among the key factors influencing destination choice (HU, C. *et al.* 2016). Cost of living, language proficiency, and cultural famil-

ilarity are essential considerations (FINDLAY, A.M. 2011). Geographic proximity may also play a role in destination choice, as individuals may be more likely to select destinations close to home or that share similar cultural backgrounds (JIANI, M.A. 2017). Ultimately, the choice of destination is a highly individualised decision based on various factors and considerations. When looking at international student destinations, it is also important to consider how this migration affects local urban change. With the increasing number of international students, the ongoing modernization of higher education infrastructure, and the expansion of university campuses, additional research should focus on phenomena such as studentification. The manifestations and spatial patterns of studentification in Central and Eastern European cities have not been extensively studied (see, for example, FABULA, Sz. *et al.* 2017).

Furthermore, the desired lifestyle and cultural environment also play a significant role in decision-making. Other factors, such as cultural and language barriers, immigration policies, and safety considerations, also influence the choice of destination. Finally, the decision to migrate is often influenced by personal and family networks. For example, family members or friends who have already migrated to a particular country may provide helpful information and assistance in the decision-making process. A migrant network in a foreign country can also act as an incentive to migrate, providing a sense of social support and familiarity in the new environment (LU, Z. *et al.* 2019).

Studying abroad can be a rewarding experience, but it is vital to consider the financial, practical, and emotional implications before deciding to study abroad. Studying abroad can also be expensive and difficult to manage financially (LULLE, A. and BUZINSKA, L. 2017). While financial support from family and personal savings is a primary source of funding for study abroad, students are increasingly opting for scholarships, student loans and work placements to fund their studies (FINDLAY, A.M. *et al.* 2012; RIAÑO, Y. *et al.* 2018).

In addition to the economic and social benefits, youth mobility also has a positive effect on the development of individuals, as it provides them with the opportunity to learn new skills, develop their knowledge and gain new perspectives (BAIRD, S. *et al.* 2021). Another benefit of studying abroad is the opportunity to experience different cultures, which can benefit the student personally and professionally. Studying abroad also allows students to learn from different educational systems, which can lead to better academic success. Additionally, it allows students to gain a global perspective, learn a second language, and experience a new culture (REDDY, J.K. *et al.* 2017).

Furthermore, it allows young adults to make international friends, discover new cultures, and develop a global outlook (KANUNGO, S. 2015). As a result, youth mobility can be beneficial in terms of personal development and social and cultural enrichment (BAIRD, S. *et al.* 2021). International students are also attracted to universities abroad because of the cultural diversity, the opportunity to learn a new language, and the chance to experience a different culture and way of life. This is especially true for students from non-Western countries who are eager to explore different cultures and lifestyles (DOERR, N.M. 2013).

One of the primary motivations for youth mobility is the pursuit of economic growth, career opportunities and better education abroad (BAIRD, S. *et al.* 2021). The competition in the job market has also driven students to pursue higher education abroad to get better job opportunities (BROWN, P. 2013). Additionally, studying abroad can help students become more independent, resourceful and confident in their abilities, which can benefit their future career prospects (HOLLOWAY, S.L. *et al.* 2012). In addition, young adults are more likely to take risks and explore the world beyond the borders of their homelands (KANUNGO, S. 2015). Moreover, young adults often study abroad to gain new experiences. However, abroad students may experience homesickness, loneliness, and culture shock (REDDY,

J.K. *et al.* 2017) even before external shocks such as the COVID-19 pandemic. Therefore, the main drivers of youth mobility are the desire for better job opportunities, the desire to explore different cultures and the need for self-development (KANUNGO, S. 2015).

During the COVID-19 pandemic, international students were heavily affected in terms of mental state, social situation, financial situation, academic achievement, and learning (GALLAGHER, H.L. 2020; YANG, P. 2022). Students were forced to switch to distance learning when schools and institutions closed, and many took a gap year or their examinations online. The added hardship of returning home, frequently with little assurance of being able to do so, was encountered by international students (ELMER, T. *et al.* 2020). The pandemic has impacted international students' mobility and access to education in ways that are still developing and will persist for some time. Nevertheless, higher education institutions have met the challenge by developing strategies and programs to aid international students in adjusting to the new reality (SAHU, P. 2020). In order to give international students a forum to interact with peers, obtain resources and assistance, and share their experiences, several universities have developed online communities for them.

Additionally, several universities have established academic and non-academic support services for international students, including online counselling, language lessons, and workshops on anything from cultural acculturation to job-hunting tactics. These programs show how higher education institutions are dedicated to helping overseas students and actively assisting in their adaptation and integration. To aid international students in maintaining connections with one another and their host countries while receiving practical support, several universities have also planned virtual activities, including cultural celebrations, music performances, and debating groups. Universities will continue to be essential to effectively integrate international students as the globe slowly recovers from the pandemic.

Few studies have examined the internationalisation of higher education and the mobility of international students to Latvia (RIVZA, B. and TEICHLER, U. 2007; AUERS, D. and GUBINS, S. 2016; LULLE, A. and BUZINSKA, L. 2017; PRAZERES, L. *et al.* 2017; CHANKSELIANI, M. and WELLS, A. 2019; APSITE-BERINA, E. *et al.* 2023). Interestingly, research investigating network perspectives concludes that ISM patterns are shifting, and the study also recognises Latvia as a new independent non-traditional destination (HOU, C. and DU, D. 2022). In a study published by CHANKSELIANI, M. and WELLS, A. (2019), it was found that in the small country of Latvia, the movement of international students is seen as an industry that generates substantial sums of foreign revenue. In addition, several universities worry that the inflow of international students poses a danger to their culture (CHANKSELIANI, M. and WELLS, A. 2019). In addition, several ancillary factors can influence international students' decisions to study in a foreign country. These include the availability of housing and accommodation, a good social and cultural environment, strong safety and security, access to public transportation, and access to quality health care (AUERS, D. and GUBINS, S. 2016).

Finally, a strong alum network in the host country can also be a pull factor for international students. This can include the availability of alum events, job opportunities, and mentoring programs. These activities can help students build relationships with other international students, alums, and faculty members, which can provide support and guidance during their study abroad experience (AUERS, D. and GUBINS, S. 2016). Further research is needed to assess the potential impact of international students and ensure their well-being in the host country.

## Methodology

The Report on Higher Education in Latvia, released in 2018 by the Ministry of Education and Science of the Republic of Latvia (IZM, 2018), is a valuable source of information on

data regarding international students in Latvia. The examination of survey and official statistics data served as the foundation for this mixed-methods study. The first stage of the mixed methods approach uses statistical information from the statistics office and the Ministry of Education and Science to show the actual situation in Latvia regarding the total number of local and international or mobile students (international students are referred to as such in national statistics). The Central Statistical Bureau (CSB) of the Republic of Latvia's database, which shows the number of international students enrolled in Latvian higher education institutions at the beginning of each academic year from 2004 to 2018, also reveals general trends on changes in the number of foreign and overall students in Latvia. Part of the second step of the mixed-methods approach was a survey of international students in Latvia. The survey's primary objective was to find out why international students choose to study in Latvia full-time.

The survey utilised 521 questionnaires from various Latvian higher education institutions and was conducted throughout the spring and fall semesters 2019. A data template was prepared in Excel to construct the analysis.

The sample consists of 521 full-time international students in Latvia who represent 52 different countries geographically. Most respondents (37%) came from the private institution – Turība University studying business and management and tourism; around one-third represent students from the University of Latvia majoring in business and management and medicine, and around 20 percent from Riga Stradins University. The remaining respondents represent students from regional institutions and engineering students from Riga Technical University. Geographically one-third of respondents are from India, 16 percent are from Germany, 9 percent are from Uzbekistan, 7 percent are from Finland, and 4 percent are from Russia.

For data analysis, the study identified four primary geographic profiles: 1. European countries ( $n = 188$ ); 2. South Asian coun-

tries, including India, Pakistan, and Sri Lanka ( $n = 177$ ); 3. Post-Soviet countries ( $n = 97$ ); 4. Other countries such as Canada and the USA. PASW Statistics 18 software was employed for survey data array analysis in this research. Data analysis involved using two econometric methods: 1. Pearson chi-square test; and 2. Analysis of variance (one-way ANOVA).

The final stage of the data used in this study was case study data at the institutional level – the case study from the University of Latvia. In the fall of 2021, the University of Latvia Academic Department (LU) surveyed international students who started their studies in 2021. The purpose of the survey was to find out the students' motivation for choosing a university and study program and, in their opinion, the essential sources of obtaining information, as well as to receive an assessment of the application and registration process. The target group was full-time international students in the first year of primary studies (college and bachelor's) and higher-level studies (master's). A total of 172 international students started their studies at the

University of Latvia in the autumn of 2021, of which 134 students participated in the survey (78% of those studying in the first year).

### Dynamics of international students in Latvia

The number of mobile students in Latvia has increased almost six times since 2004 – from 1,677 students in 2004 to 9,810 students in 2021 – making up almost 13 percent of the total students (CSB, 2014, 2022a) (Figure 1). The number of mobile students has been increasing since 2005, however, in 2020 and 2021, the number has decreased (IZM, 2021). In the 2021/2022 academic year, 3,800 mobile students have enrolled, which is by a quarter less than at the beginning of the 2019/2020 academic year. However, for the second consecutive year, the total number of mobile students, which had been on a significant upward trend before the COVID-19 pandemic, has slightly decreased (CSB, 2022b).

Up until the outbreak of the pandemic, international students in Latvia were on the rise yearly (Figure 2). Most were students from

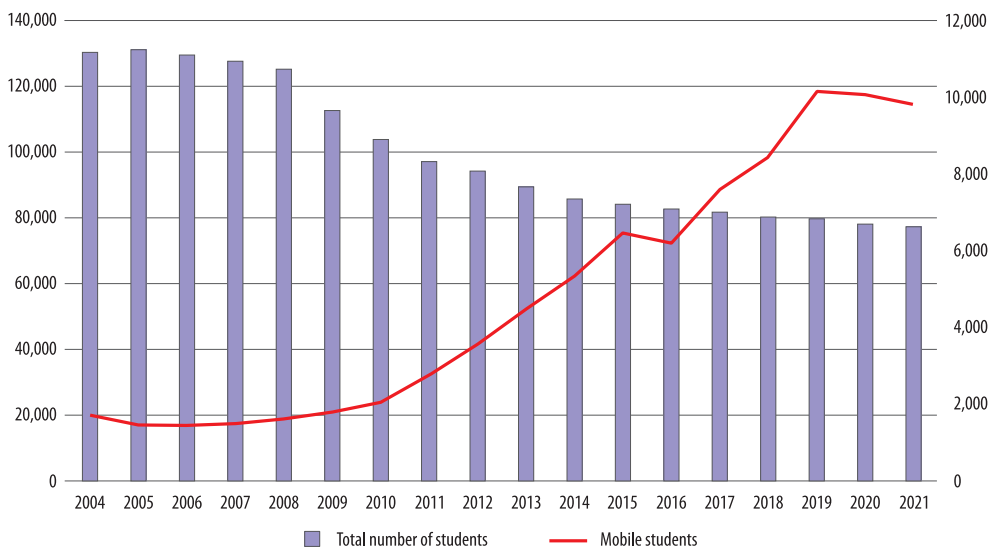


Fig. 1. Dynamics of total number of students and mobile students in Latvia, 2004–2021. Source: Author's own elaboration based on data from the Central Statistical Bureau of Latvia.

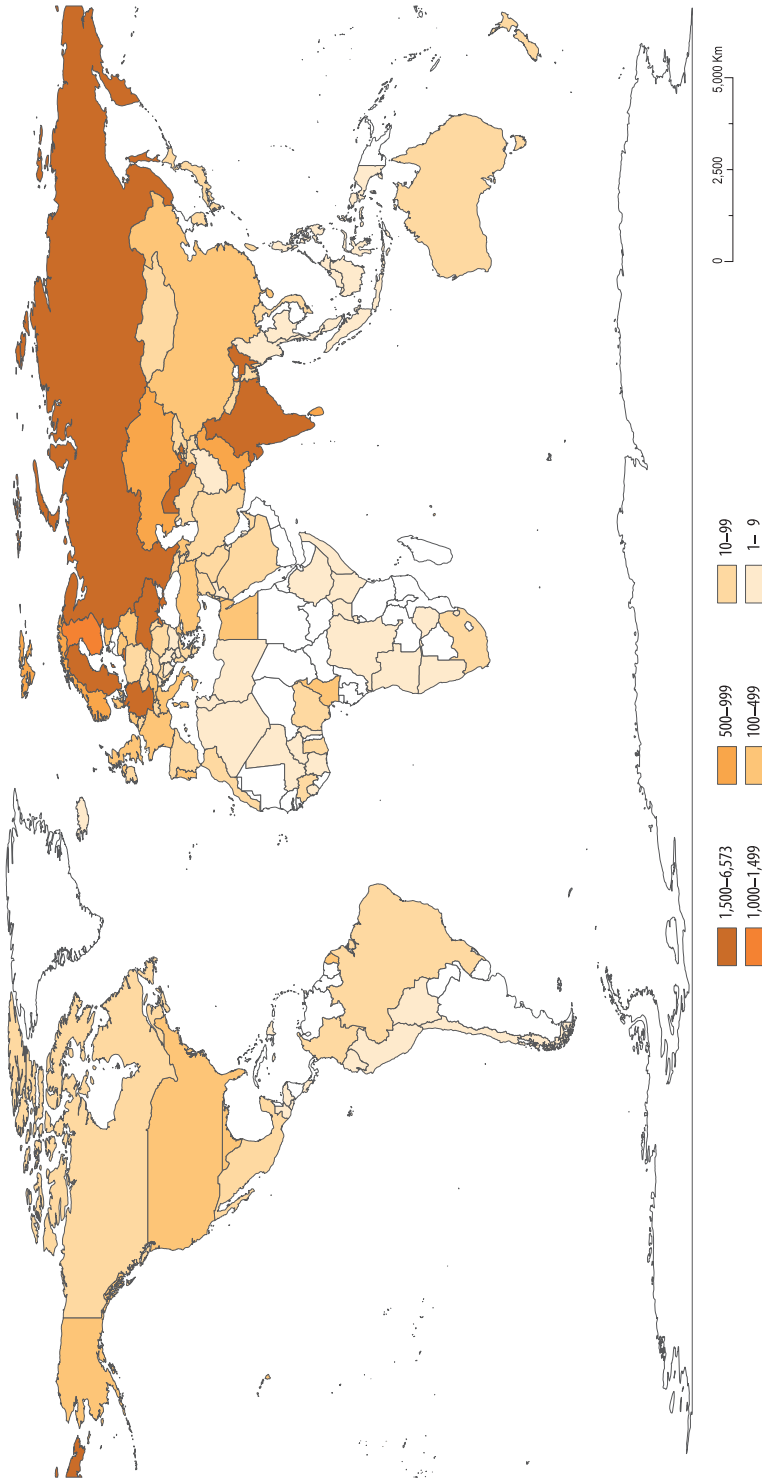


Fig. 2. Number of international students in Latvia by countries of origin, 2019–2021. *Source:* Author's own elaboration based on data from the Central Statistical Bureau of Latvia.

three parts of the world: Europe, the former Soviet Union's republics, and Southeast Asia. The former Soviet Union republics of Russia, Ukraine, Belarus, and Kazakhstan are home to many international students in Latvia. They accounted for 47 percent of all international students in 2020. Southeast Asian students, who comprised 28 percent of all international students in Latvia, were the second-largest group.

With 25 percent of all international students in Latvia, the third-largest group was from Europe. According to data from the Ministry of Education and Science, the number of international students has climbed by 82 percent over the previous three years, reaching 10,000 at the start of last year, which was 20 percent more than in 2019 and a half as much as in 2014.

Most mobile students (70.4%) have received their previous education in countries outside the European Union, and almost two-thirds are males. In recent years, it can be consistently observed that about half of the total number of mobile students are students who received their previous education

in India, Uzbekistan and Germany (41.8% of the total number). More than half (58.2%) of the students from Germany studying in Latvian higher education institutions are females. In comparison, most students from India and Uzbekistan who have come to study in Latvia are males (82.7% and 81.0%, respectively). More than 2,000 mobile students who received their previous education in India are currently studying in Latvian higher education institutions. Compared to 2014, when statistics on mobile students were first collected, this number has increased more than ten times (CSB, 2022b).

In 2021, 116 different nations' citizens attended higher education institutions in Latvia (CSB, 2022a). The most common fields of study for mobile students are social sciences, business, and law (41.2%), health and welfare (29.3%), and natural sciences, mathematics, and information technologies (11.6%) (Figure 3). Almost half (49.2%) of the mobile student study at the master's level, while 45.8 percent study at the bachelor's level. Of the mobile students with prior education in EU countries, 85.6 percent study at the master's level. Most mobile stu-

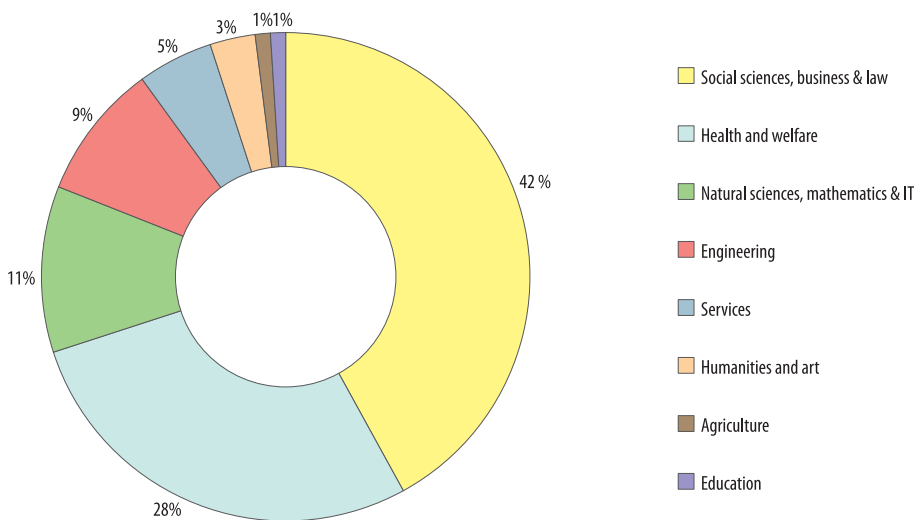


Fig. 3. Share of international students in Latvia by thematic education group, 2019–2021. Source: Author's own elaboration based on data from the Central Statistical Bureau of Latvia.

dents with previous education in EU countries study Health and social welfare programmes (78.1%) (CSB 2022b).

In terms of total numbers, most mobile students (2,500) study at Riga Stradins University, almost 80 percent of whom have completed their studies in an EU country. This compares with 52.6 percent at the University of Latvia, and only 3.2 percent at Riga Technical University of mobile students with previous education in EU countries. These three universities have 5,000 students, or 51.5 percent of the total mobile student population (CSB 2022b).

**Why choosing Latvia as a study destination country: Geography as a precondition for study destination choice**

Survey results from the year 2019 show that students from India, Germany, Uzbekistan, and Kazakhstan are the countries that most frequently choose Latvia as their study-abroad location. More in-depth statistical analysis of the data presented in *Table 1* indicates a statistically significant relationship among the four groups of students. Specifically, the findings demonstrate that Latvia is more likely to be the primary choice for students from South Asian countries but less likely to be the preferred destination for students from Europe and post-Soviet countries.

These results suggest that Latvia serves as a secondary option for students from countries with limited study opportunities, either due to a restricted number of students in specific study programs (e.g., medicine in Germany, France) or the overall availability of educational resources in their home country (e.g., Uzbekistan). The motivations of these students vary, although they all share the same goal, obtaining a quality education in Latvia. While students from India select Latvia on purpose as a location to obtain a European certificate, students from European nations travel to Latvia to study if, for some reason, they are unable to complete the needed education in their own countries.

Table 1. Analysis of factors significant in the host country

Measure/region	Europe		Southeast Asia		Post-Soviet		Other		F(3,492)
	M	SD	M	SD	M	SD	M	SD	
Quality of studies	3.69	1.14	4.02	1.15	4.16	0.88	4.04	1.37	4.72**
Baltic region	2.14	1.22	3.38	1.29	2.60	1.28	2.14	1.38	29.71**
Studies in English	4.08	1.09	4.13	1.18	4.44	0.93	3.96	1.48	2.78*
Friends in Latvia	1.66	1.11	2.13	1.35	1.86	1.20	1.48	1.05	5.04**
Family in Latvia	1.34	0.98	1.62	1.16	1.48	1.02	1.28	0.89	2.29*
Employment	1.61	1.09	2.94	1.39	3.04	1.32	2.88	1.48	42.11**
Cost of living	2.70	1.16	3.77	1.25	3.54	1.07	3.21	1.40	25.29**
Culture and traditions	2.69	1.20	3.77	1.25	3.14	1.36	2.93	1.41	21.16**
Capital Riga	3.15	1.39	3.57	1.30	2.96	1.50	3.00	1.59	4.99**
Russian language	1.47	1.09	2.44	1.31	2.55	1.56	1.63	1.20	19.38**

\*p < 0.05, \*\*p < 0.001.

Riga as a destination was rated relatively high, as studied in the Baltic region. German students had given lower ratings for these factors. The possibility of studying in English was acknowledged in Latvia as one of the most significant considerations in favour of studying this area in a recognised quality. Students from Germany primarily travel to Latvia to study medicine. The study also explained the geographical locations that international students find most concerning while relocating to Latvia. Concerns regarding access to social services and medical care throughout their studies are shared among international students.

Geographically three sourcing regions are highlighted: Europe, former Soviet Union countries, and Southeast Asian countries. Analysis also shows different initial motives and plans among respondents. For example, European students most often study medicine, and Latvia is usually a low priority when choosing a destination. Students from former Soviet Union countries often come to Latvia to study technical programs like engineering, computer sciences, and economics. Southeast Asian students often choose Latvia to study business and finance.

A detailed analysis of the decision-making process regarding studying in Latvia reveals several vital factors. Firstly, the importance of studying English and the quality of education emerged as crucial considerations. This factor received the highest overall mean rating (4.44) among students from post-Soviet countries, followed by South Asian respondents (4.13) and European students (4.80).

Conversely, the lowest factor across all groups in considering Latvia as a destination choice was the level of engagement with friends and relatives from Latvia. Additionally, the desire for employment opportunities ranked modestly, with a mean value of 3.04 among students from post-Soviet countries, 2.94 among Southeast Asian students, and the lowest among Europeans, with a mean value of 1.61. The increasing number of international students engaging in the local labour market across various

economic fields raises concerns. However, it prompts the question of whether international students' knowledge and skills align with Latvia's economic development priorities.

Latvia is a popular destination for international students due to its low tuition fees and living costs compared to other European countries. The quality of education is also high, and the country is politically stable. Furthermore, Latvia is part of the European Union, which allows students to easily access the labour market and travel to other EU countries.

Due to its affordable tuition and generally high educational standards, Latvia is one of the most alluring nations for overseas students from Southeast Asia. According to only one-third of respondents from EU nations, studying in Latvia was their first option. Students from Southeast Asia comprise a quarter of this group. They are more likely than students from post-Soviet countries – over half of the respondents – to choose Latvia as their top study destination.

The availability of high-quality education, affordable tuition, and the chance to study abroad were the critical factors in choosing. Latvia is a study-abroad location. Latvia is a popular location for students from Southeast Asia since it is one of the safest nations in Europe. In addition, Latvia provides a variety of scholarships, as well as cultural and other events, for overseas students. When choosing a destination country, it was crucial for them to study in English and to have high-calibre education, according to a thorough review of the decision-making process. The overall mean value rating for this indicator is rated highest by students from post-soviet nations (4.44), followed by respondents from Southeast Asia (4.13), and students from Europe (4.80) study-abroad.

Furthermore, the research findings indicate that Southeast Asian students value Latvia's affordable living expenses. Conversely, students from wealthier European nations, such as Finland, Sweden, France, and Germany, consider living expenses less significant. On the other hand, students from post-Soviet nations, including Russia, Uzbekistan, and Belarus,

prefer the higher chances of finding work in Latvia and the opportunity to socialise in the Russian language. This preference aligns with the prevailing trend of students from post-Soviet countries engaging in part-time employment while pursuing their studies. A significant Russian-speaking population in Latvia, particularly in the capital city of Riga, makes it easier for students from post-Soviet nations to connect with others and explore potential career opportunities. As a result, they tend to secure employment in Latvia more readily than students from other student groups.

The findings further confirm that Latvia is often regarded as a “second choice” among European students as a study destination. Their level of importance in obtaining a European diploma is relatively lower than students from other regions. This discrepancy could be attributed to the students’ geographic origin, as studying within Europe is often seen as more accessible and expected for European students. In contrast, individuals from more distant regions may perceive a European diploma as a significant achievement.

Additionally, European students tend to rate most motivational factors lower than students from other groups, except for the desire to live in a city. This suggests that the appeal of Riga as a study location and the chosen study program hold considerable value for European students, compensating for other motivational aspects.

### **Experience from the University of Latvia**

The findings of the survey conducted by the University of Latvia, encompassing a majority of international students, revealed the program preferences of the participants. Out of the total 172 international students surveyed, the majority chose to pursue healthcare programs (56%), followed by information technology (12%), management, administration, and real estate management (10%), and language and cultural studies (9%). Among the respondents, 81 percent were studying at the undergraduate level, while 19 percent were

enrolled in higher-level programs. Moreover, regarding geography, 46 percent are citizens of the European Union (EU), including 16 percent from Finland, and 12 percent from Germany, while 54 percent are citizens of other countries, including 13 percent from India, and 7 percent from Russia.

18 percent of respondents’ mother tongue is Russian, 12 percent German, 8 percent English, and 62 percent another language. The majority (92%) of students, rated their knowledge of the English language as good or excellent.

The main reasons that influenced the choice of the study program were the ambition to gain knowledge about this field, the opportunity to study in English, the industry’s perspective in the future, and the subjects of this field that were good at school. The most significant differences between groups of countries can be observed: full-time job opportunities in Latvia after graduation (marked by 30% of citizens of EU countries and 57% of citizens of other countries).

The main reasons that influenced the choice to study directly at the University of Latvia among students from EU countries were the desire to learn new knowledge or deepen existing knowledge (97%), the desire to obtain a university diploma to prove oneself and one’s abilities (95%), the study programs offered by the University of Latvia (92%), as well as the opportunity to obtain quality education (90%). In addition to these factors, students from other countries also highly valued the visibility of the University of Latvia (85%, of which students from the EU 72%). Students rated the opportunity to get a state scholarship the lowest.

According to the University of Latvia, international students cluster in medicine from Finland and Germany, followed by degree students from Uzbekistan and India. Among those specific geographic and study field choices, studies at the University of Latvia have been a priority choice. These results contradict when considering results from all universities and study fields in Latvia. Studies in medicine are well known for their quality at the European level and elsewhere.

## Conclusions

This article presents evidence on trends of international student mobility to Latvia by linking the geography of the source country. It discusses the perspective of Latvia as a non-traditional destination country.

The research findings highlight the student's country of origin's significant role in choosing Latvia as a study destination. While students from Southeast Asia prioritise Latvia over other potential destinations due to its affordability and availability of English-language education, students from the former Soviet Union do not consider it as their first choice. However, it remains a prominent study location for European students. The results indicate that factors such as low tuition fees, the attractiveness of the city, and the appeal of the chosen study program play a crucial role in influencing European students to select Latvia as their destination country. The findings imply that the European diploma's value is lower among European students and that the student's place of origin heavily influences the decision-making process. Additionally, the findings imply that choosing to study in Latvia is likely influenced by the allure of the nation's culture and way of life and the possibility of obtaining a job there. However, due to language barriers and lack of job opportunities, most international students need to be better integrated into the local labour market.

Latvian higher education institutions can use the results of this study to develop enticing programmes and marketing materials that emphasise the benefits of studying there. The main reasons for choosing Latvia as a destination country are its low cost of living, low tuition fees, and good quality of education. International students in Latvia appreciate the multilingual environment.

The findings can also guide marketing plans for student groups interested in studying in Latvia. Finally, the findings of this study may be utilised to guide national and local governments in making decisions on how to promote higher education in Latvia and recruit international students effectively.

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# The impact of the COVID-19 pandemic on cross-border shopping tourism: the case of Hungary

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## Abstract

By today the smooth functioning of the global economy has been highly dependent on the uninterrupted flow of factors across borders. The free flow of tourists is also inevitable for the proper functioning of the global tourism industry. However, tourism and various forms of cross-border (tourism) activities were put under unprecedented pressure due to the COVID-19 pandemic, since most countries, including Hungary, introduced serious restrictions on mobility to slow down the spread of the virus. This paper focuses on a relatively under-researched topic, cross-border shopping tourism in the context of the COVID-19 pandemic. Before the outbreak of the pandemic, shopping tourism was deemed to be an increasingly important component of the tourism value chain. Several studies have demonstrated that shopping has become one of the most favourable activities among tourists and one of the major categories of tourists' expenditure. Based on the review of the relevant literature, the paper introduces the notion and forms of shopping tourism and discusses the major research topics with special regard to the effects of the pandemic and other types of crisis events. The impact of the pandemic on shopping tourism is observed through the example of Hungary, whereby the effects of restrictions, exchange rate fluctuations, and price-level differences on the number of in- and outbound shopping trips, and the related expenditures, are evaluated. Results show that re-bordering processes due to the pandemic have not only resulted in an unprecedented decline in cross-border shopping tourism, but they also contributed to the spatial restructuring of shopping (tourism) and retailing. The pandemic not only sustained cross-border differentials vital to shopping tourism but sometimes even created new forms of them; these differences, however, could not counter the negative effects of restricted international mobility. The paper aims to contribute to the literature on cross-border tourism by reviewing the effects and consequences of COVID-19 and related restrictions on shopping tourism.

**Keywords:** shopping tourism, cross-border shopping, COVID-19, pandemic, crisis, Hungary

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## Introduction

During the past decades, tourism had to face numerous global and regional crisis events and challenges (HALL, C.M. 2010), such as natural disasters (SHARPLEY, R. 2005), anthropogenic environmental problems (SCOTT, D. *et al.* 2012), economic and financial crises (PAPATHEODOROU, A. *et al.* 2010), political crises, instabilities and terrorist attacks (HANON, W. and WANG, E. 2020), as well as pan-

demics and the spread of diseases (ZENG, B. *et al.* 2005). Many of the crisis events affecting tourism have been an integral part of human history for thousands of years; however, in today's world they are receiving ever greater attention. One of the reasons behind this is the dramatic growth in the scale of human mobility, the other is that due to growing global integration and interconnectedness local crises can spread quickly and cause global disruptions.

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In 2020 global tourism had to face an unprecedented external shock in the shape of the COVID-19 pandemic (HALL, C.M. *et al.* 2020a). Since no vaccines and/or effective medical treatments were available at the beginning of the pandemic, most countries applied non-pharmaceutical interventions (GÖSSLING, S. *et al.* 2020; FOTIADIS, A. *et al.* 2021) such as travel restrictions, lockdowns, closure of non-essential businesses. Restrictions introduced by governments on non-essential mobility had an immediate impact on tourism causing a sudden transformation from overtourism to non-tourism.

The pandemic has resulted, among other things, in a fundamental change in travel behaviour (NEUBURGER, L. and EGGER, R. 2021), and in a disruption of the accommodation sector, including the Airbnb market as well (BOROS, L. *et al.* 2020). The pandemic also fundamentally changed tourism destination communication (PACHUCKI, C. *et al.* 2022), it heavily affected tourist travel risk and management perceptions (RAHMAN, M.K. *et al.* 2021), forced tourism firms to re-evaluate their business models (FOTIADIS, A. *et al.* 2021), and made governments develop strategies for the recovery of tourism (COLLINS-KREINER, N. and RAM, Y. 2020). Besides these changes, several researchers think that the COVID-19 pandemic could also bring a paradigm shift in the tourism industry which could lead to a greener, more resilient, inclusive, equal, and sustainable tourism in the future (HALL, C.M. *et al.* 2020a; IOANNIDES, D. and GYIMÓTHY, S. 2020; RASTEGAR, R. *et al.* 2021; WIĘCKOWSKI, M. 2022).

Shopping is one of the most favoured leisure activities during a holiday, and for more and more tourists it is the primary or even sole motivation for travel (TIMOTHY, D.J. and BUTLER, R.W. 1995; TIMOTHY, D.J. 2005; WTO, 2014). Cross-border shopping is the most common type of borderlands tourism (TIMOTHY, D.J. 1999). Research on shopping tourism has focused on a wide range of topics (CHOI, M.J. *et al.* 2016), such as tourist shoppers' satisfaction (LEE, J.S. and CHOI, M. 2020), behaviour (HOBSON, J.P. and CHRISTENSEN,

M. 2001), motivations (SUNDSTRÖM, M. *et al.* 2011), shopper typologies (JOSIAM, B.M. *et al.* 2005), perception of risks (YÜKSEL, A. and YÜKSEL, F. 2007), service quality (YEUNG, S. *et al.* 2004), the significance of souvenirs (SWANSON, K.K. and TIMOTHY, D.J. 2012), and the role of shopping in tourism development (JANSEN-VERBEKE, M. 1991; GETZ, D. 1993).

Researchers on shopping tourism have devoted limited attention to crisis events, papers in this context have focused on the financial crisis of 2007–2008 (MICHALKÓ, G. *et al.* 2014) and the Ukrainian crisis of 2013–2014 (SMĘTKOWSKI, M. *et al.* 2017; STEPANOVA, S.V. and SHLAPEKO, E.A. 2018). Results have shown that financial, economic and/or geopolitical crises may have a significant impact on the exchange rates of national currencies which may result in price differences along international borders that are large enough to support cross-border shopping tourism. However, results also demonstrate that the impact of price-level differences generated by exchange rate fluctuations is usually temporary, volatile, and short-lived (TIMOTHY, D.J. 2005; MICHALKÓ, G. *et al.* 2014).

Despite the widespread interest in COVID-19 related tourism research the effects of the pandemic on shopping tourism have remained relatively under-researched. Therefore, based on the review of the literature and on statistical data analysis this paper aims to identify the changes that the COVID-19 pandemic in 2020–2021 has caused in cross-border shopping tourism with special reference to Hungary and examine what long-term consequences may arise from this crisis. Since the permeability of borders is a crucial factor in cross-border shopping tourism, we argue that re-bordering processes in response to the COVID-19 pandemic resulted in a serious decline in this activity. The study extends the shopping tourism literature by showing the transformations of this tourism product due to the COVID-19 pandemic.

The next section introduces the notion and basic forms of shopping tourism. This is followed by the presentation of the impact of the pandemic on shopping tourism by reviewing

the international literature. After introducing the data and methods used, the results are presented. First the general conditions of shopping tourism to and from Hungary are discussed whereby we evaluate the stringency level of anti-COVID-19 measures in Hungary and its neighbouring countries and examine the changes in the exchange rate of the Hungarian forint (HUF). This is followed by an examination of the number of shopping trips to and from Hungary and the related expenditures during the pandemic based on the analysis of the database of the Hungarian Central Statistical Office (HCSO) on international trips. We conclude this paper by outlining the implications for the future of shopping tourism in the last section.

### Notion and forms of shopping tourism

In the broadest sense shopping tourism is an activity involving the purchase of goods and services when visiting various places (CHOI, M.J. *et al.* 2016). The World Tourism Organization (WTO) defines shopping tourism as a contemporary form of tourism fostered by individuals for whom purchasing goods outside of their usual environment is a determining factor in their decision to travel (WTO, 2014).

Shopping can either be the primary (sometimes sole) or the secondary (complementary) motivation behind tourist trips. If a tourist trip is primarily motivated by shopping (TIMOTHY, D.J. 2005), and the traveller's primary tourism activity is shopping, we speak about shopping tourism. On the other hand, when shopping is a secondary or complementary activity during a tourist trip it is termed as tourist shopping (TIMOTHY, D.J. 2005). In this case, shopping primarily serves as an activity which provides pleasure and memorable moments for tourists, and which contributes to higher tourist spending and to the diversification of the tourist experience.

A unique type of shopping tourism is shopping in border areas – also known as cross-border shopping (MICHALKÓ, G. and TIMOTHY, D. 2001), which takes place near international

boundaries usually due to economic, legal, and social differences (SPIERINGS, B. and VAN DER VELDE, M. 2013; SZYTNIIEWSKI, B.B. *et al.* 2017; MICHALKÓ, G. *et al.* 2022). Cross-border shopping tourism is a prominent field of research in border studies. Although borders are usually seen as barriers to tourism, they can still create economic and/or legal contrasts (e.g., tax and price differentials) that provide favourable conditions for cross-border activities such as shopping, gambling or medical tourism (WIĘCKOWSKI, M. and TIMOTHY, D.J. 2021). Cross-border shopping tourism is present virtually all over the world; however, due to the social, economic, and political transformations, as well as the changes in the role and character of borders, it has received particular attention in Central and Eastern Europe (KOLOSOV, V. and WIĘCKOWSKI, M. 2018).

The EU's eastern enlargement and the inclusion of most CEE countries in the Schengen Area resulted in re- and de-bordering processes at the same time. The opening of the internal borders of the EU enabled higher levels of cross-border mobility, including cross-border shopping (SZYTNIIEWSKI, B.B. *et al.* 2017). On the other hand, a significant drop occurred in cross-border shopping tourism at the Belarusian, Russian, and Ukrainian borders as these countries found themselves at the external borders of the enlarged EU and later of the Schengen Area (BAR-KOŁEŁIS, D. and WENDT, J.A. 2018). Nevertheless, the local border traffic zone experiment – whereby visa-free traffic was introduced for citizens living in neighbouring Polish and Russian regions between 2012 and 2016 – has proved that there are effective tools to improve cross-border trade and support the economy even at the external borders of the EU (SAGAN, I. *et al.* 2018).

The COVID-19 pandemic in 2020–2021 is another recent example of re-bordering (WIĘCKOWSKI, M. and TIMOTHY, D.J. 2021) since many governments decided to close State borders in response to the spread of the virus which had severe negative impacts on cross-border shopping (MAKKONEN, T. 2022).

## The impact of the pandemic on shopping tourism

In line with other tourism products, shopping tourism suffered significant decline due to the re-bordering processes during the COVID-19 pandemic in 2020–2021. Shopping was deemed to be a risky activity with respect to the spread of the virus, and therefore many countries restricted the opening hours of shops, set rules for the maximum number of customers on a square metre basis and temporarily closed non-essential retail units. As a result, there was a fundamental shift in the nature of shopping (tourism) during the years of the pandemic. First, there was a decline in leisure-oriented shopping which was coupled with a rise in more utilitarian motivations. Second, international and cross-border shopping tourism lost ground and domestic destinations were preferred instead, since travelling within a country was subject to less stringent regulations. Third, the new circumstances urged customers to turn to alternative channels, such as (cross-border) online shopping. Even in periods when stores were allowed to be open, compulsory face coverings, limitations on the number of customers, and the fear of getting infected made shopping less enjoyable, causing discomfort to tourists (CORNELL, D.A.V. *et al.* 2022) and discouraging them from shopping (at least in-person). In extreme cases, such as in Baarle Hertog (Belgium) and Baarle Nassau (Netherlands), where shops lie astride an international boundary, customers were even prohibited from crossing the borderline at the microscale inside individual shops (WIĘCKOWSKI, M. and TIMOTHY, D.J. 2021).

The first weeks of the pandemic were characterized by panic buying and stockpiling. Through the example of New Zealand, HALL, C.M. *et al.* (2020b) found that, due to increased media coverage and growing public awareness of the crisis, groceries spending increased significantly in mid-March 2020. The housewares, hardware and electrical sectors also experienced a spike in consumer spending as shoppers obtained electrical goods (e.g., bread makers) deemed to be necessary for an extended

lockdown. The demand for medical protective products (such as face masks, alcohol, protective suit, disinfectants, medical gloves and goggles, etc.) also skyrocketed leading to product shortages (ZHANG, J. *et al.* 2021).

Several studies on (cross-border) shopping tourism in the context of the COVID-19 highlight the negative (economic) consequences of the crisis. Retailers and service providers who built their businesses on the demand from cross-border and tourist shoppers have found themselves in a particularly difficult situation. Studying the Polish-German borderland, MALKOWSKI, A. and MAZUR, R. (2020) argue that Polish entrepreneurs suffered significant revenue losses, since the border closure halted the flow of shopping tourists from Germany to Poland. TILAKI, M.J.M. *et al.* (2021) investigated vendors' attitudes and their receptiveness towards international tourists during the COVID-19 pandemic in Malaysia's night markets and found that most of them had to face serious challenges, since they had no income during the lockdown period. In addition, most vendors are involved in the informal economy characterized by low income levels, thus, it is not surprising that most of them supported the reopening of international borders to tourists as soon as possible to gain income from tourist shoppers.

Several studies claim that the pandemic has had an especially devastating effect on luxury shopping tourism. One reason for this is that China, which represented 90 percent of the growth of the global luxury market in 2019 (DEL VALLE, A.S. 2020), implemented serious restrictions on international mobility causing a serious drop in luxury tourism. The other reason behind the decline in luxury sales is that during the pandemic customers were either not able to or were reluctant to visit luxury retail stores (KLAUS, P. and MANTHIOU, A. 2020). These problems were further intensified by the fact that the luxury retail industry relies heavily on visitors and shopping tourism. Based on a qualitative survey, SYED, A. and HAQ, F. (2021) found that the demand by tourists for luxury goods not only decreased because of restricted mobil-

ity but also because consumers started shopping more consciously focusing on their basic needs. Moreover, uncertainties related to the pandemic, declining levels of income (due to working from home), and changes in consumers' priorities (preferring items necessary to survive the pandemic) also had a negative impact on luxury goods buying intentions.

The spatial restructuring of shopping (tourism) and retailing was another consequence of the pandemic. For instance, notable geographical redistributions of alcohol sales and consumption in Europe were detectable during the pandemic. LEIFMAN, H. *et al.* (2022) argue that Europe saw significant changes in alcohol availability due to the closing of bars, restaurants, and international borders resulting in an increase in domestic sales in countries with high cross-border inflow of alcohol. Nevertheless, results also show a general decrease in the total amount of alcohol consumed per capita in inflow countries as not all cross-border purchases were replaced by domestic sales.

By analysing card payments to the retail sector in Switzerland during the COVID-19 crisis KRAENZLIN, S. *et al.* (2020) revealed substantial payment shifts from urban to suburban and rural areas, as well as notable rearrangements among cantons. They argue that one plausible explanation for this shift lies in the fact that urban cantons are more likely to suffer from the absence of tourism and business travel. They also claim that the impossibility of shopping tourism caused an increase in excess retail payments in Switzerland, since residents in the country were 'forced' to spend their money at home due to border closures.

Similar 'positive' effects of the pandemic on domestic retail sales are explored by BAGGS, J. *et al.* (2022) who calculated that, on average, the USA-Canada border closure generated a 1.49 percent offsetting gain in revenues for small Canadian retailers located within 150 kilometres of the border. This was primarily due to the fact that the border policy prohibiting Canadians from crossing the border for non-essential travel shifted some revenue from cross-border purchases

to Canadian retailers. These extra revenues were able to partially counter the losses that retailers experienced during lockdowns.

The drop in cross-border shopping not only had a serious impact on the geographical distribution of spending, but also on the structure and organization of the retail sector, being already under change caused by the dynamically evolving e-commerce. These processes have also generated transformations in urban spaces. Based on a case study in Barcelona, FRAGO, L. (2021) found that the collapse of global tourist/consumer flows (together with the spread of online shopping) accelerated the commercial desertification of the traditional city centre and led to the temporary or permanent closure of retail establishments.

The impossibility of (cross-border) shopping tourism during the pandemic undoubtedly increased the role of online shopping. E-commerce had been on the rise well before the outbreak of the pandemic; however, this external shock has accelerated the already ongoing transformation process of the retail sector (BECKERS, J. *et al.* 2021). Nevertheless, according to HALL, C.M. *et al.* (2020b) online purchases during the pandemic primarily targeted domestic e-tailers instead of international ones, as COVID-19 resulted in diminishing confidence in the reliability of international shipping and postal services.

The geographical disparities in the distribution of and access to COVID-19 vaccines also resulted in the emergence of a unique phenomenon: vaccine tourism, which can be regarded as a special form and combination of medical and shopping tourism. The essence of this phenomenon is that vaccine tourists travel to locations where they can access vaccines ahead of others or get the type of vaccine unavailable in their home countries (KAEWKITIPONG, L. *et al.* 2021). A significant proportion of vaccine tourists originated from the Global South and targeted the Global North; however, due to temporary shortages, vaccine tourism also occurred among countries with similar level of development or even among states in the USA (KORSTANJE, M.E. 2022).

## Data and methods

First the general conditions of Hungary's shopping tourism were examined, whereby we evaluated the stringency level of anti-COVID-19 measures in Hungary and its neighbouring countries and analysed the changes in the exchange rate of the HUF. The assessment of the stringency of anti-COVID-19 measures was based on the stringency index calculated by the Oxford Coronavirus Government Response Tracker (OxCGRT) project<sup>3</sup>. This index (using nine metrics<sup>4</sup>) records the strictness of government policies on a scale from 0 to 100, where 0 means the least stringent and 100 represents the most stringent response level (HALE, T. *et al.* 2021). In this study the average yearly and quarterly stringency index values were calculated for Hungary and its seven neighbouring countries for 2020 and 2021.

The changes in the exchange rates of the HUF were assessed by using the database of the Hungarian National Bank. First the mean exchange rates of the currencies of the neighbouring countries expressed in HUF were calculated for 2019, 2020 and 2021. Then base indices (2019 = 100%) were calculated for 2020 and 2021.

The selection of these indicators is justified by the evidence presented in the literature review section of this paper where we have shown that both policy responses to COVID-19 and exchange rate fluctuations may have a strong impact on cross-border shopping tourism.

The rest of the results section presents the analysis of the changes in the number and share of shopping trips to and from Hungary and the related expenditures in 2020 and 2021 compared to 2019 data. The analysis is

based on the database of the HCSO on international travels<sup>5</sup>. The HCSO collects data on in- and outbound trips through questionnaire surveys in the form of personal interviews which are conducted at land and air border crossing points (in the case of Schengen borders interviews are conducted nearby the former border checkpoints) with the help of trained interviewers<sup>6</sup>. As the HCSO publishes data according to the main travel motivations as well, it is possible to analyse the characteristics of shopping trips, which can provide an overall picture of Hungary's in- and outbound shopping tourism<sup>7</sup>. Data are processed through descriptive statistics, through time series, base indices calculation, and part-to-whole ratios.

## Stringency of anti-COVID-19 measures in Hungary and its neighbours

Most countries in the region started introducing anti-COVID-19 measures at the end of January 2020, however, stringency indices started increasing rapidly only in March as the first cases were detected. As a result, the first quarter of 2020 was characterized by relatively low levels of restrictions. The most stringent measures were in force in April 2020, which was followed by the gradual easing of restrictions in May. During the summer of 2020 less stringent regulations were in force, thus, the third quarter of the year saw a significant drop in stringency indices. However, as the second wave of COVID-19

<sup>3</sup> Data available at: <https://github.com/OxCGRT/covid-policy-tracker/tree/master/data>

<sup>4</sup> School closures; workplace closures; cancellation of public events; restrictions on public gatherings; closures of public transport; stay-at-home requirements; public information campaigns; restrictions on internal movements; and international travel controls.

<sup>5</sup> Data available at: [https://www.ksh.hu/stadat\\_eng?lang=en&theme=tur](https://www.ksh.hu/stadat_eng?lang=en&theme=tur)

<sup>6</sup> The detailed methodology of data production is available at: [https://www.ksh.hu/apps/meta.objektum?p\\_lang=EN&p\\_menu\\_id=110&p\\_almenu\\_id=104&p\\_ot\\_id=100&p\\_obj\\_id=BDGD](https://www.ksh.hu/apps/meta.objektum?p_lang=EN&p_menu_id=110&p_almenu_id=104&p_ot_id=100&p_obj_id=BDGD)

<sup>7</sup> Since the target populations of the HCSO surveys are Hungarian travellers leaving Hungary and foreign travellers entering Hungary we use the terms 'Hungarians' and 'foreigners' instead of 'residents' and 'non-residents' throughout this paper.

arrived, countries started tightening measures again; this was accompanied by a rise in stringency indices, although the severity of measures (on average) did not exceed the level of the second quarter of the year. Due to the third wave of COVID-19 most countries introduced additional restrictions resulting in increasing stringency indices during the first quarter of 2021. The Hungarian government followed an especially strict policy at that time, which is represented by the fact that the country's stringency index was higher in the first quarter of 2021 than in the second quarter of 2020 and Hungary had the second highest value in the region. With the rising level of vaccinations and decreasing cases, governments started to ease restrictions from May causing a drop in stringency indices in the third quarter of 2021. Due to rising cases the last quarter of 2021 saw a modest increase in stringency levels again (Figure 1).

A detailed look at anti-COVID-19 measures in Hungary (Figure 2) shows that the government introduced restrictions, such as the closure of borders and certain shops, as well as limiting the opening hours and capacity of non-essential businesses, that were similar to other countries and caused serious disruptions to shopping tourism.

In sum, especially in the first period of the pandemic, government responses in the region showed similarities, nevertheless some spatial and temporal differences could also be detected. These differences created new aspects of cross-border asymmetries that are

vital to the existence of cross-border activities, such as shopping tourism. Nevertheless, severe and often quickly changing restrictions on the international mobility of tourists largely hindered the exploitation of cross-border differences. Responses introduced by the Hungarian government and their timing were roughly in line with the measures taken by the governments of neighbouring countries until mid-2021. However, from the third quarter of 2021 the Hungarian government focused on vaccinations instead of restrictions, thus, a gradual abolition of anti-COVID-19 measures started, and the country's stringency index became the lowest in the region (see Figure 1, A).

### Changes in the exchange rates of the HUF

Except for the Ukrainian hryvnia (UAH), the HUF significantly declined against the currencies of the neighbouring countries (Figure 3) during the examined period. The largest devaluation (more than 10%) was detectable against the EUR and the Serbian dinar (RSD), but substantial weakening took place against the Croatian kuna (HRK) (almost 9%) and the Romanian leu (ROL) (app. 6%) too. The UAH to HUF exchange rate was subject to larger fluctuations; the first half of 2020 was characterized by the strengthening of the UAH, then the HUF became slightly stronger.

In sum, foreigners visiting Hungary during the pandemic could buy more products and

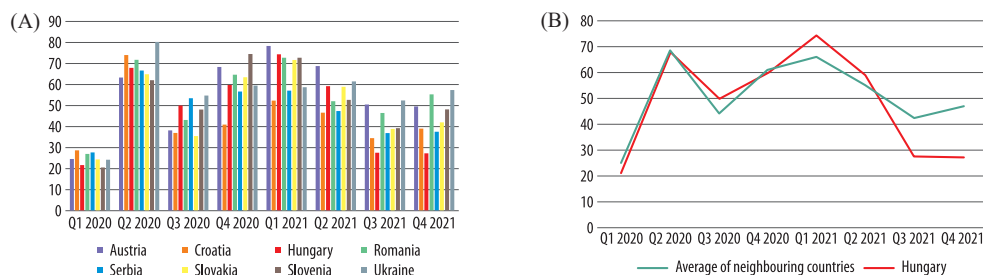


Fig. 1. Quarterly averages of stringency indices in Hungary and its neighbouring countries (A), and Hungary's stringency index in comparison to the average of neighbouring countries (B). Source: Edited by the authors based on data from OxCGRT.

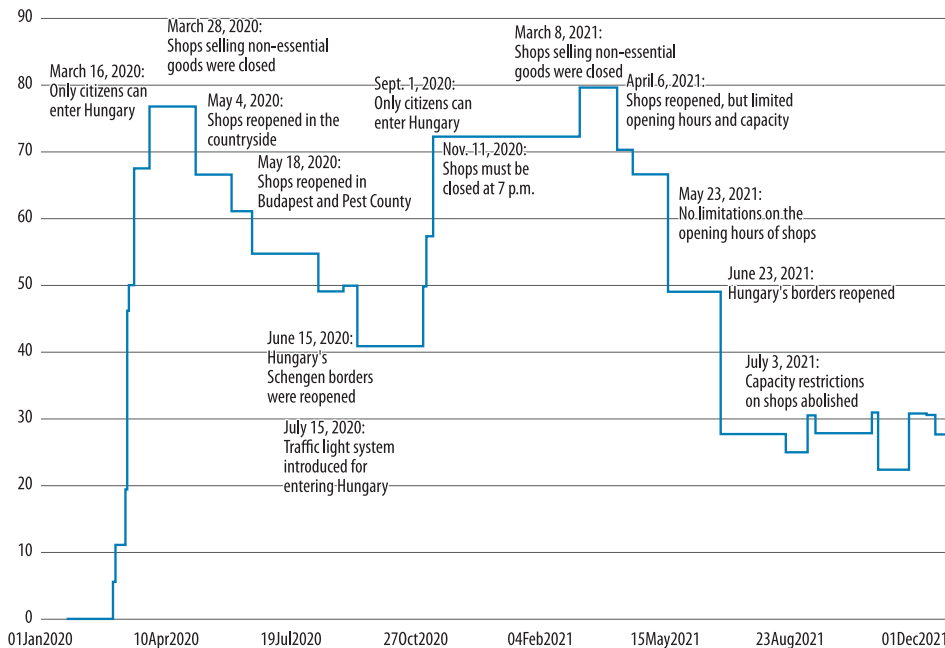


Fig. 2. COVID-19 stringency index in Hungary and selected restrictions related to shopping tourism (2020–2021). *Source:* Edited by the authors based on data from OxCGRT.

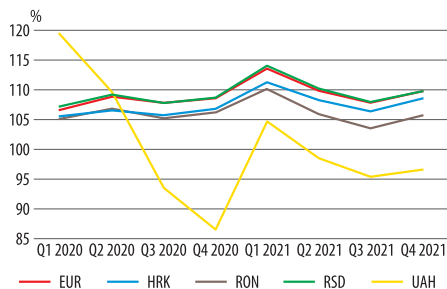


Fig. 3. Base indices of the mean exchange rates of the currencies of the neighbouring countries expressed in Hungarian forint (HUF) (the same quarter of 2019 = 100%). *Source:* Edited by the authors based on data from the Hungarian National Bank.

services for the same amount of money, while Hungarians travelling abroad had to face increasing prices. Thus, changes in the exchange rates of the HUF favoured shopping tourism to Hungary and created less favourable conditions for outbound shopping tourism.

### Changes in the number of (shopping) trips to and from Hungary and in the related expenditures during the pandemic (2020–2021)

The number of inbound trips to Hungary in 2020 was down by 48 percent compared to the previous year, and the decline was roughly the same in the case of shopping trips as well, thus, the share of shopping trips within the total number of inbound trips hardly changed. The following year (2021) saw some recovery, as inbound trips increased by 16 percent from the previous year; nevertheless, this figure was still almost 40 percent below the pre-pandemic level. On the other hand, inbound shopping trips were down by more than 20 percent compared to 2020 and by 60 percent to 2019, thus, shopping trips only accounted for 12 percent of all inbound trips in 2021 (Figure 4, A).

Outbound trips by Hungarians were also characterized by a significant (almost 50%) decline in 2020 from the previous year and an even more severe decline was detectable

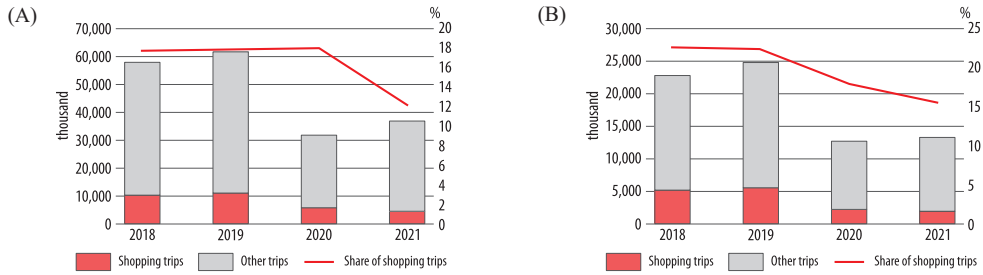


Fig. 4. Number and share of inbound shopping trips to Hungary (A), and outbound shopping trips by Hungarians (B), 2018–2021. *Source:* Edited by the authors based on HCSO data.

in the case of outbound shopping trips being almost 60 percent down compared to 2019. Thus, the share of shopping trips fell to 18 percent of all outbound trips in 2020. The next year saw a gradual recovery as outbound trips were up by 4 percent compared to 2020, but still almost 50 percent down compared to 2019. On the other hand, outbound shopping trips in 2021 dropped by 9 percent from the previous year, and they were down by more than 60 percent compared to 2019. Thus, the share of shopping trips fell to 15.6 percent of all outbound trips in 2021 (Figure 4, B).

Expenditures (at current prices) related to inbound trips in 2020 were down by 54 percent compared to 2019, meanwhile expenditures related to inbound shopping trips dropped by 45 percent. As spending related to shopping trips decreased to a lesser extent than the total spending, the share of expenditures related to shopping trips increased by almost 2 percentage points to 11.4 percent from the previous year. Although expenditures related to inbound trips in 2021 increased by 28 percent from the previous year, but they were still 42 percent down compared to 2019. Meanwhile, the spending of shopping tourists to Hungary in 2021 fell by 6 percent from the previous year and it was down by 48 percent compared to 2019. Thus, expenditures related to inbound shopping trips accounted for 8.4 percent of the total spending in 2021 (Figure 5, A).

Expenditures related to outbound trips by Hungarians in 2020 were down by 58 percent compared to 2019, while Hungarian shop-

ping tourists' spending fell by 50 percent. Thus, the share of expenditures related to outbound shopping trips rose to 19 percent. In 2021 expenditures related to outbound trips by Hungarians increased by 27 percent from 2020, however, they were still 47 percent down compared to 2019. Meanwhile, Hungarian shopping tourists' spending fell by 8 percent from 2020 and it was down by 54 percent compared to 2019. Thus, expenditures related to outbound shopping trips by Hungarians accounted for 14 percent of the total spending in 2021 (Figure 5, B).

Regarding the structure of spending related to international trips it is detectable that during the pandemic (2020–2021) the relative share of food and beverages as well as fuel increased within the total expenditure.

Quarterly changes in the number of in- and outbound (shopping) trips (Figure 6, A), and in the related expenditures (Figure 6, B) clearly reflect the impact of anti-COVID-19 measures introduced by national governments. The first quarter of 2020 was characterized by the least decline both in terms of the number of trips and the related expenditures since governments started introducing serious restrictions only from March. The second quarter saw a drastic drop in the number of international trips and the related expenditures with the introduction of severe anti-COVID-19 measures. A temporary improvement occurred in the third quarter of 2020 since during the summer less severe restrictions were in force in most countries.

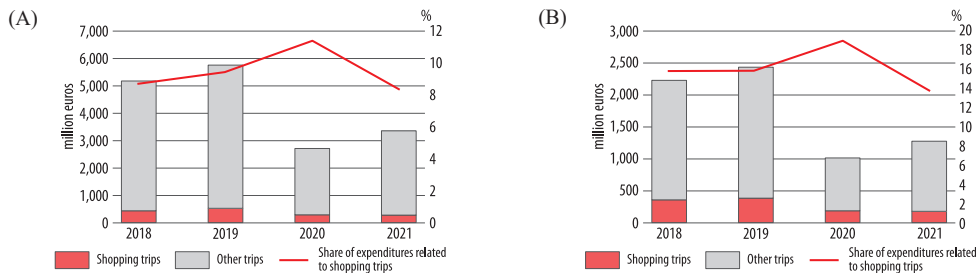


Fig. 5. Sum and share of expenditures related to inbound shopping trips to Hungary (A), and to outbound shopping trips by Hungarians (B), 2018–2021. Source: Edited by the authors based on HCSO data.

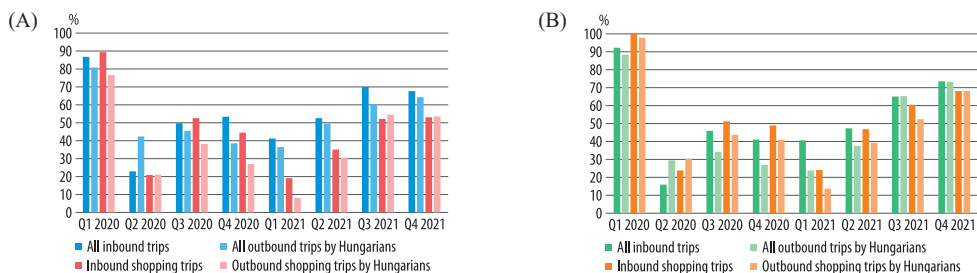


Fig. 6. Quarterly changes in the number of (A), and in the expenditures related to (B) in- and outbound trips and shopping trips (the same quarter of 2019 = 100%) Source: Edited by the authors based on HCSO data.

However, as governments started tightening measures with the arrival of the second wave of COVID-19 trips and expenditures started declining again. Except for the number of total inbound trips, the first quarter of 2021 saw the worst figures, which was particularly true for shopping trips.

The reason for this lies in the fact that several countries, including Hungary, introduced the most serious restrictions in this quarter (Hungary ranked second after Austria in the average stringency index of Q1 2021). Due to the gradual easing of restrictions, a relatively dynamic recovery in the number of trips and expenditures could be detected during the second and third quarters of 2021, nevertheless, the number of all in- and outbound trips and the related expenditures were still 30 or 40 percent lower in Q3 2021 than in the same quarter of 2019. In addition, the recovery in the number of in-

and outbound shopping trips and the related expenditures was even slower. The dynamic increase in the number of trips halted in the fourth quarter of 2021 (except for outbound trips by Hungarians) as some countries tightened COVID-19 measures again. Meanwhile the rising trend in expenditures continued, however, this was predominantly due to inflation and the weakening of the HUF.

Finally, we examined the effects of the level of COVID-19 stringency indices and the EUR/HUF exchange rate<sup>8</sup> on the volume of shopping tourism to and from Hungary (Table 1). The analysis was based on quarterly data from 2020 and 2021, however, the first quarter of 2020 was disregarded, since the first two months of 2020 were virtually unaffected by COVID-19 related restrictions.

<sup>8</sup> Exchange rates of other currencies were disregarded because they showed similar tendencies to the EUR/HUF exchange rate except for the UAH (see Figure 3).

Table 1. Pearson correlation matrix among the volume of shopping tourism, COVID-19 stringency indices and EUR/HUF exchange rate\*

Indicators	Var1	Var2	Var3	Var4	Var5	Var6
Var1	1.00	–	–	–	–	–
Var2	0.90	1.00	–	–	–	–
Var3	0.96	0.93	1.00	–	–	–
Var4	0.93	0.97	0.96	1.00	–	–
Var5	-0.93	-0.95	-0.93	-0.92	1.00	–
Var6	0.06	-0.04	0.23	0.07	-0.01	1.00

\*Var1 = Number of inbound shopping trips to Hungary; Var2 = Number of outbound shopping trips by Hungarians; Var3 = Expenditures related to inbound shopping trips to Hungary; Var4 = Expenditures related to outbound shopping trips by Hungarians; Var5 = Average stringency index in Hungary and its neighbours, Var6 = EUR/HUF exchange rate. *Source:* Calculated by the authors based on data from the HCSO, HNB and OxCGR.T.

Results show that there is a very strong negative correlation among stringency levels (Var5) and the number of in- and outbound shopping trips (Var1, 2), as well as the related expenditures (Var3, 4). This means that the volume of cross-border shopping tourism significantly declined when governments introduced stricter measures against COVID-19. On the other hand, only weak or very weak correlation can be detected between the EUR/HUF exchange rate (Var6) and the volume of shopping tourism (Var1,2,3,4). These results imply that the dynamics of cross-border shopping tourism between Hungary and its neighbours were primarily determined by the stringency of anti-COVID-19 measures (i.e., the permeability of borders, rules on shopping, etc.), and exchange rate fluctuations could not counterbalance this tendency.

## Discussion and conclusions

In this study, we examined the impact of the COVID-19 pandemic on cross-border shopping tourism with special reference to Hungary. Our results show that the pandemic caused an unprecedented decline in international travels, including cross-border shopping, which are consistent with the main findings of the literature (GÖSSLING, S. *et al.* 2020; MALKOWSKI, A. and MAZUR, R. 2020; FOTIADIS, A. *et al.* 2021). The restrictions applied by the Hungarian government were roughly in line with inter-

national standards (HALE, T. *et al.* 2021) and these measures had a decisive impact on the evolution of the number of in- and outbound (shopping) trips (cf. *Figure 1.* and *Figure 6.*)

Although MICHALKÓ, G. *et al.* (2014) found that the weakening of the HUF during the financial crisis of 2007–2008 intensified shopping tourism to Hungary, our results show that the weak HUF during the pandemic could not counter the decline caused by restrictions. Nevertheless, before the pandemic the number of outbound shopping trips accounted for app. 50 percent of inbound shopping trips, while in 2020 and 2021 they accounted for only 40 and 47 percent, respectively, showing that inbound shopping trips declined to a lesser extent than outbound ones, justifying the impact of the exchange rate.

The increasing share of food, beverages, and fuel in the expenditures related to international trips shows that utilitarian shopping motivations gained ground over leisure motives during the pandemic, which is in line with the findings of SYED, A. and HAQ, F. (2021).

The geographical differences in the nature and level of restrictions, as well as in the pace of introducing and lifting these measures created new forms of cross-border asymmetries. For instance, in December 2021, shopping tourism from Slovakia to Hungary intensified since shops were closed due to COVID-19 restrictions on the Slovak side of the border.

The growing level of governmental interference in the economy to mitigate the negative

social impacts of the pandemic also created new factors affecting shopping tourism. For instance, the Hungarian government imposed a fuel price cap in November 2021 to curb price rises, inducing a massive wave of fuel tourism to Hungary from neighbouring countries.

However, it is an unexpected result that while a gradual recovery began in Hungary's tourism in 2021, this was not detectable in shopping trips. A plausible explanation for this fact is that rising fuel prices made shopping tourism less profitable; moreover, some customers probably got used to regular (cross-border) online shopping as some researchers predicted (BECKERS, J. *et al.* 2021; FRAGO, L. 2021).

The COVID-19 pandemic also raises questions regarding the future of shopping tourism. New pandemics in the future, political conflicts (such as the Russia-Ukraine war), the spread of technology and cross-border e-commerce, changing consumer habits and lifestyles, disruptions in global supply chains, as well as government responses to crises (e.g., sanctions, restrictions) and their economic consequences (e.g., inflation, shortage of goods) carry significant risks and uncertainties for the future of shopping tourism.

Although some researchers think that once the pandemic is over shopping tourism is going to return its 'normal' pre-pandemic state (BUNGHEZ, C.L. 2021), most scholars argue that due to fundamental social and economic changes triggered by the pandemic shopping tourism will not be the same after the end of the pandemic, rather it is going to get to a new normal state.

It is very likely that a group of customers will get used to regular online shopping and would also like to enjoy the benefits of e-commerce once the pandemic is over (BECKERS, J. *et al.* 2021), thus, offline shopping (tourism) has to face a new challenge from cyberspace.

As the COVID-19 pandemic has significantly transformed consumption habits, consumers have become more reliant on electronic devices and applications to meet their consumption needs. In light of the higher technology usage LOH, E.G. and STEPHENSON,

M.L. (2021) argue that it is vital for tourism retailers to embed e-commerce advancements into their selling and marketing initiatives to attract tourist shoppers in the post-pandemic era, as well as to stay competitive and ensure business sustainability.

GARCÍA-MILON, A. *et al.* (2021) argue that due to the pandemic tourists have increased their intention to use smartphones, especially to make payments for purchases, because during the pandemic electronic payment systems were recommended, even mandatory. They also claim that the application of modern technology (such as smartphones, mobile applications, contact-free payments) may help to recover from the crisis caused by the pandemic and encourage tourists' shopping. These findings imply that destinations and retailers should pay more attention to digitalisation in the future as tourists will be more willing to use mobile applications to obtain information about shopping opportunities, compare products and prices, as well as to make secure and contactless payments.

However, the growing level of digitalisation in the retail sector may have a profound effect on traditional, offline retailing, and, thus, on retail spaces in city centres and high streets. BECKERS, J. *et al.* (2021) claim that there is a risk that small retailers will lose ground in e-commerce in favour of larger ones if they do not continue to develop their online channels in the post-pandemic era. This would result in revenue losses and may lead to shop closures. FRAGO, L. (2021) also expresses a rather pessimistic view on the future of retail activities linked to tourism as he anticipates that the growing role of online channels will result in the continuation of shop closures in the streets.

Economic, social, legal differences on opposite sides of international borders are the major driving forces behind cross-border shopping tourism. In our opinion, the differences in national responses to various hypothetical future crisis events may sustain cross-country differences that enable shopping tourism in the future too; however, due to the extremely rapidly changing conditions, very hectic fluctuating

tuations may occur in the volume and directions of shopping tourism.

Destinations and retailers relying on tourism should follow a diversified strategy to mitigate future risks. Destinations should reduce their reliance on a single tourism product, like shopping tourism, and try to enrich their offer by developing new attractions. Retailers should target a wider range of customers, for instance, by following an omnichannel strategy and placing larger emphasis on (cross-border) e-commerce and digitalisation as suggested by GARCÍA-MILON, A. *et al.* (2021) and by LOH, E.G. and STEPHENSON, M.L. (2021). Finally, we believe that the pandemic is an excellent opportunity to rethink the future of shopping tourism and transform it in a way to minimize its negative environmental, social, and economic effects for a better and sustainable future.

An important limitation of the study is that we only examined the number of (shopping) trips to and from Hungary and the related expenditures; therefore, more comprehensive studies in the future should use more parameters and examine shopping tourism in the context of the retail sector as well. In addition, future research could focus on how shopping tourism can contribute to improving the quality of life while avoiding negative environmental processes and preventing crises.

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## Mobility patterns of satellite travellers based on mobile phone cellular data

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### Abstract

For a long time, tourism statistics were the only reliable source of information on tourism mobility. Tourism statistics are inadequate for the analysis of tourist mobility within state borders and across Schengen Borders without using registered accommodations. Big data offers the opportunity to gain a better understanding of tourism movements, for example, same-day tourist flows in metropolitan areas. Here, we introduce the concept of the satellite traveller to more effectively investigate the nature of tourism between the large city and its surroundings. As tourists communicate via cellular devices, the use of mobile phones offers an opportunity for researchers to explore the mobility pattern of tourists. In this article, we discuss the specificities of mobility in Hungary by SIM card users registered in foreign countries. The analysis is based on the Telekom database. We seek to answer the question to what extent the information from the satellite tourists' mobile phone use can help to understand their movements and to identify frequented places less commonly accounted for in tourism statistics. The most important findings of our investigation are (1) the confirmation of former knowledge about spatial characteristics of same-day tourist flows in the Budapest Metropolitan Region, (2) the insight that far away settlements are also visited by satellite travellers, and (3) the methodological limitations of mobile phone cellular data for tourism mobility analysis.

**Keywords:** big data, metropolitan region, same-day visit, unconventional tourism, Budapest

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### Introduction

The city-region has been a focal point in the history of travel, from the time of Thomas Cook to present day, but particularly during the dynamic development of the tourism industry from the 1960s onward (HUA, H. and WONDIRAD, A. 2021). Settlements located in an agglomeration are integral supporters of tourism of the nearby metropolis like satellites orbiting in the Earth's gravitational field, ensuring the efficient communication of people. These so-called satellite settlements provide additional labour force and

purchasing power for the successful operation of the metropolis, moreover, they also induce flows, especially because of their role in the tertiary or quaternary sectors (BURKE, J. 1986; MERRILEES, B. *et al.* 2013). The essence of the phenomenon described in this study as *satellite tourism* is the tourist mobility between the large city and its surroundings, without overnight stays (i.e. day trips; STETIC, S. *et al.* 2011). The nature of satellite tourism may be similar in many respects to the tourist behaviour observed in transit settlements, namely in terms of length of stay and expenditure (KINCSES, Á. *et al.* 2017). The

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main difference is the ease of returning to the nearby city, which, unlike transit tourists, does not put satellite travellers under time pressure, allowing them to spend their free time more comfortably, get to know the place better and enjoy more colourful experiences.

The need for a better understanding and more accurate observation of satellite tourism induces the development of the available methodological arsenal. The understanding of certain phenomena and processes of metropolitan tourism has been a focus of research studies for a long time (GIRARDIN, F. *et al.* 2008; YANG, Y. 2012; KÁDÁR, B. and GEDE, M. 2013), but the geographical extent of the same-day tourist mobility between the metropolis and its agglomeration zone has been neglected. This topic fits well with invisible tourism under the theoretical umbrella of unconventional tourism mobility (KÁDÁR, B. and GEDE, M. 2022; KOVALCSIK, T. *et al.* 2022; TIMOTHY, D. *et al.* 2022; TÓTH, G. and KINCSES, Á. 2022) and enriches the knowledge about destinations involved in same-day visits (WYNEN, J. 2013a, b) and their archetypical consumers, the day trippers (MURILLO, J. *et al.* 2013).

In our study, we seek to answer the question of the geographical range of foreigners' journeys to and from Budapest, the capital of Hungary, that are taken within a 24-hour period. Budapest is a popular destination for international tourists (especially among young visitors) because of its favourable geographical location, wide range of tourist attractions (e.g., baths, ruin bars, UNESCO World Heritage Sites) and relatively affordable prices for goods and services (IRIMIÁS, A. 2010; PINKE-SZIVA, I. *et al.* 2019). In addition to Prague (16.4 M) and Vienna (15.3 M), Budapest (9.4 M) also recorded significant amounts of international tourist nights in 2019, with the Austrian capital having the strongest link in terms of tourist flows (KÁDÁR, B. and GEDE, M. 2021). Like other European capitals (FREYTAG, T. 2010), the surroundings of Budapest are very popular with international day trippers, mainly Szentendre (pedestrian street milieu), Gödöllő (royal palace), and Visegrád (panorama on the Danube river bend).

This study offers an opportunity to improve the methodology for tourism-oriented cognition based on the cellular information of mobile phones. Given the negative impact of the COVID-19 pandemic on tourism, the research was based on data from 2019, the last undisrupted year for passenger traffic. A substantive part of the study was based on the analysis of a huge database of geo-coordinates from mobile phone calls placed within the municipality in 2019, using simple and complex mathematical, statistical and geoinformatics methodologies. The database contains information on the calls (data traffic) of foreigners who made the first and last calls from Budapest on the selected days between 0–24 hours and who also made at least one other call (data traffic) in Hungary. We seek to answer the question to what extent the information from the satellite travellers' mobile phone use can help to understand their movements and to identify frequented places less commonly reflected in tourism statistics. The results contribute to broadening the theory of unconventional tourism mobility to a deeper understanding of the nature of satellite tourism and to the development of a tourism-oriented research methodology based on mobile cellular data.

### **Big data in tourism mobility research**

The increasing use of info-communication technologies (ICT) and big data, including mobile phone network data for modelling location and urban mobility networks, has opened new perspectives in modelling human mobility (WANG, Z. *et al.* 2018; HUANG, B. and WANG, J. 2020). Individuals leave digital footprints in geographical space. The human digital footprint is a widely studied area that increasingly uses data integration methods to generate information on individuals' spatial presence and movement. Data sources can either be terrestrial or applied to various remote sensing technologies (SAGL, G. *et al.* 2014; SAGL, G. and RESCH, B. 2015). Terrestrial data sources are usually called geospatial big data. They are comprised of information on

daily human activities. Data are collected either by data service providers in the form of mobile cell and cellular signalling data and GPS positioning data (STEENBRUGGEN, J. *et al.* 2013; VANHOOF, M. *et al.* 2018; ZHANG, Y. *et al.* 2019; MATA, F.J. *et al.* 2020) or by business services as a by-product provided in the form of POS-terminal data or housing transactions data, or they can be crowd-sourced by social media check-ins and fitness applications, etc. (THAKURIAH, P. *et al.* 2020). The spatial and temporal resolution of geospatial big datasets has grown over time. Telecommunication network data, called Call Detail Records (CDR), are widely involved in social and geographical analyses, specifically in urban studies (LOUAIL, T. *et al.* 2014; PUCCI, P. 2015; JIANG, S. *et al.* 2016; RAZAVI, S.M. *et al.* 2018; EGEDY, T. and SÁGVÁRI, B. 2021).

Human mobility patterns show specific regularities: individually varying travel distances and a defined probability of returning to frequented locations are the most striking characteristics (GONZÁLEZ, M.C. *et al.* 2008). A periodic recurrence in mobility patterns implies that individual spatiotemporal distribution is heavy-tailed. That means most people spend most of their time in a handful of locations. Meanwhile, a smaller set of individuals spends their time in a large variety of locations, that contribute less than 1 percent to an individual's time consumption (BAYIR, M.A. *et al.* 2009). CANDIA, J. *et al.* (2008) highlighted that spatiotemporal dynamics follow daily and weekly commuting patterns in agglomeration areas. The periodicity observed in the CDR data enables us to focus on higher spatiotemporal granularity.

The penetration of the social physics approach and its analytical framework has been accelerated by the growing number and depth of the available datasets. Statistical data and surveys are appropriate measures for recognizing the inherent structure of tourism-related mobility networks and exploring the behavioural patterns and motivations of the actors involved. High-scale human mobility databases, however, provide significantly more information in terms of

representation and behavioural pattern discovery compared to classical statistical data collection and processing methods.

Graph-analytical tools, on the other hand, prove to be insufficient for the inclusion of the geographical dimension as an explanatory factor in tourism research (HANNAM, K. *et al.* 2014). Research about interconnectedness in tourism, such as destination relationships, can be conducted by analysing the internal and external links of spaceless nodes. In this case, the online connectivity (e.g., browser searches) and offline connectivity (e.g., sequences of places which were visited on a trip) of the network nodes that constitute a local system can be compared with other local tourism networks. The network topology of tourism nodes can be approached in a similar way in global comparisons (BAGGIO, R. 2020). Unlike spaceless network investigations, those that apply spatial dimensions in a systematic way and as an explanatory factor are often conducted for policymakers (CHU, C.P. and CHOU, Y.H. 2021), often in the fields of tourism transport infrastructure planning (QIAN, C. *et al.* 2021) or heritage tourism (LIU, Z. *et al.* 2022). A detailed overview of the databases used for tourism research and visitor tracking has been given by REIF, J. and SCHMÜCKER, D. (2020). In destination management, not only the patterns and dynamics of visitation but also the order of places visited and the time spent at a given location can provide valuable information (AHAS, R. *et al.* 2008, 2010; RAUN, J. *et al.* 2016; SALUVEER, E. *et al.* 2020; LUŠTICKÝ, M. and ŠTUMPF, P. 2021).

### **Mobile cellular data for better understanding of daily tourist flow**

There are critiques on the efficacy of geospatial big data (including mobile cellular data), which have been relevant in our work as well. Among these, the positioning accuracy resulting from the tower coverage currently is an inescapable limitation, which significantly hinders the resolution of human mobility mapping. Another limiting factor is

the event-dependent nature of the sampling. Data is only generated when an event has occurred on the network. Smartphones tend to log in at least once every 30 minutes but devices using less complex technology do not communicate with towers outside of events (REIF, J. and SCHMÜCKER, D. 2020). Daily visitor traffic and commuting traffic can be similarly defined by specifying a sleeping point and daytime stopping point. The sleeping point can be identified by the location of the first and last events that occurred during the day and can be interpreted as the individual's location at home. Our analysis targets daily visitor traffic. Therefore, we are looking for individuals who are spending their days away from their sleeping point but return for nights. That implies that in cases where the first and last event differs, even due to the inactivity of the device, the user is not included in the searched manifold, and the user's mobility data is not incorporated into our dataset. The phenomena of data loss are a commonly cited shortfall of big data processing. However, there are techniques to reduce the amount of data lost. The more precisely we are able to define the target population, the less data loss we experience.

In this study, our target population was satellite travellers using the Hungarian MTelekom network with a foreign SIM card. Our interpretation was that they started their first and initiated their last event of the day from Budapest but also gave a signal from a location outside Budapest during the day. The target group of tourism-purpose visitors can be easily separated from the professional traffic of non-Hungarian residents based on the functional distribution of places. Commuting out of the city is a non-typical movement, even among Hungarian SIM card holders, as the spatial distribution of workplaces in the Budapest Metropolitan Region is concentrated first and foremost in the central city and less significantly in the extended industrial areas located in the functional metropolitan area and the urban periphery (DÖVÉNYI, Z. and KOVÁCS, Z. 2006; SZABÓ, T. et al. 2014). Workplaces are concentrated in specific delineated metro-

politan areas, corresponding to industrial areas (EGEDY, T. et al. 2017). The Budapest Metropolitan Region shows an extremely concentrated distribution regarding institutional amenities (only one university is located there) and recreation and sports facilities, which implies that daily commuting outside of the city for study and other purposes is also infrequent among Hungarian citizens. We concluded that the spatial distribution of workplaces in the Budapest Metropolitan Region differs significantly from the topography of places of tourist destinations. Therefore, we can safely isolate the tourism traffic of non-Hungarian mobile phone users from professional traffic.

In our case study, we sought to understand the processes, driving forces and dynamic changes in space when it comes to non-Hungarian satellite tourism traffic in order to be able to correctly interpret a large amount of data and the phenomena it reveals. For this reason, we decided to adopt a classical social geography approach without using the network science tools applied in mainstream science. Network science tools are mainly used to analyse the interconnectedness of spatial relationships, which have little added value in studying a local system and interpreting its operational regularities.

### **Clustering as a methodological tool for generalising human movements**

We consider quantitative tools such as spatial-temporal clustering valuable data reduction and generalisation methods. We adopt the interpretation of YUAN, Y. and RAUBAL, M. (2012) when we use the inter-municipal clustering method, which provides a generalised description of individual movement processes: „Since individuals are atoms in an urban system, the spatio-temporal characteristics of an urban system can be viewed as a generalization of individual behaviour; therefore, mobile phone data also provide new insights into the analysis of the mobility patterns in urban systems.” (YUAN, Y. and RAUBAL, M. 2012, 26.)

The first step in the clustering process is selecting an appropriate set of variables contributing to a mobility model explaining non-Hungarian visitors' movements. The clustering procedure involves grouping records – in our study, municipalities – in such a way that any subject within the resulting group is closer to all other elements in the group than to any other element outside the group. The concept of 'closeness' can be understood here in relation to the variables under investigation: for  $n$  observation units (that correspond to a specific settlement in the current case) if the number of variables under investigation is  $m$ , then the  $n$  observation units are placed in a standardised coordinate system of dimension  $m$  and then grouped through multiple iterations (ALDSTADT, J. 2010). K-means clustering requires that the expected number of groups is determined in advance. In our case, we established six clusters in the first step and then reduced the number of clusters until we obtained a stable number of clusters based on the size of the cluster populations and the location of the cluster centres. The K-means clustering procedure selects random cluster centres according to the predefined number of centres and then calculates the distance of all elements from the initial cluster centres. Suppose a specific record is closer to another cluster centre than its centre according to the initial classification. In that case, the element is reclassified, the centres are recalculated, and the distance of the elements from the centres is measured. The iteration continues until all elements are assigned to the cluster centre closest to them. This multidimensional classification procedure contributes to typifying settlements according to the role they play in non-Hungarian visitors' satellite tourism traffic (LINGRAS, P. *et al.* 2011; BOSE, I. and CHEN, X. 2015; WANG, W. *et al.* 2018).

## Data and experimental design

### *Data source*

Our analysis was based on a mobile phone dataset provided by a Hungarian telecom-

munications operator. Data acquisition was accomplished by CSFK (Research Centre of Astronomy and Earth Sciences) with Hungarian Telekom Ltd (MTelekom), a member of the Deutsche Telekom Group. A research and development agreement was signed to explore the mobility performance of mobile phone users in Hungary in general and especially within the broader region of the Budapest Metropolitan Region. Hungarian Telekom is the long-term market leader in voice, multimedia and wireless services in mobile telecommunication, holding a stable market share of 45 percent in the Hungarian telecommunication market. According to the joint research agreement, Hungarian Telekom enabled CSFK to reach network system data via a SFTP-based interface. After a four-month-long period of data specification and data structuring and one extra month for the pilot run, data transmission started on 1 November 2017, and lasted until 30 November 2019. Data was uploaded daily. Via the data transmission interface, a package of four data files arrived at CSFK every day for two years. Files contained data referring to the daily event traffic, equipment in use, equipment attributes and actual network coverage.

Mobile phone network data analytics and visualisation reveal human mobility patterns reflecting individuals' real-world spatiotemporal dispersion. The geographical component of mobile telecommunication network data is registered, collected, and processed worldwide using similar technologies for data retrieval.

By establishing the research database, we retained the rich-in-detail feature provided by the exceptionally high amount and scale of data (e.g., geographical and temporal resolution, communication performance, etc.) and, at the same time, provided a comprehensive framework for deploying mobile cell data in applied social sciences. Our research database was built on individual equipment records. Each object corresponded to a mobile device equipped with a mobile SIM card, carrying out the multimedia transfer on the MTelekom wireless network. Each record, therefore, pertained to an individual

user holding an MTelekom subscription or a non-Hungarian mobile device user using the MTelekom telecommunication network while staying in Hungary. The anonymity of the device holder was secured by hashing the equipment identifier by a randomly generated artificial ID. The equipment identifier was recoded every 24 hours. As a result, the investigation of mobility histories was only available for 24-hour timeframes.

### *Building the database*

Six designated days have been selected from the two years of data available. We involved three public holidays (15 March 2019, 20 August 2019, 23 October 2019), and three other regular working days (Mondays) that followed the public holidays (18 March 2019, 26 August 2019, 28 October 2019). By selecting the dates involved in the analysis, we intended to exclude the domestic satellite traffic as much as possible to avoid interference with foreign satellite movements. On the occasion of long weekends and public holidays, a higher proportion of Budapest citizens (of both foreign and national origin) leave the city for a longer period, so they do not take part in satellite traffic. We summarised the events registered by non-Hungarian satellite travellers staying at and departing for any daily trip from Budapest. Satellite travellers were defined as device-holders registered abroad that started and ended their day in Budapest, meanwhile generating at least one event from a municipality other than Budapest between the first and last signal on the same day.

A typical problem that arises while processing mobile cellular data is that the system data collected from the towers is extremely noisy and subject to errors due to the incorrect registration of towers. Data noise, among others, results in extreme speeds (> 300 km/h) when it comes to mapping individual mobility trajectories. The error rate might reach 20 percent of all detected individual movements. Mobility trajectories are derived from registered telecommunication events, as they store the exact time of the event and the approximate location of tower,

which carried out the event. A telecommunication event is defined as a user's communication with a telecommunication tower, regardless of whether voice, text or data is distributed during the event. In the scientific literature, CDR are the data detected on telecommunication towers, which approximate the content of what we define as an event. Event log data includes a timestamp, the duration of the communication, the technology used, the nature and direction of the communication, etc.

At the time of our study, 45,000 MTelekom towers served the national telecommunication network traffic. The geolocation of the coverage area's geometrical centre represents the towers' positions. The exact coordinates constitute a business secret. We assigned each tower to the basic administrative units of Hungary (municipal level), according to the distance of the tower position to the nearest residential area. In the current study, we did not apply the filtering of extreme speed event records since the procedure used standard speed to estimate the time spent by users. As a result of the procedure, extreme speed movement necessarily reduces the estimated time spent by users in each municipality to close to zero, so invalid records do not significantly change the satellite mobility model, and, at the same time, they do not cause data loss in the database.

It is essential to highlight that mobile cellular data processing does not allow for the accurate localisation of users. The granularity of localisation refers to the spatial resolution of the telecommunication coverage areas, ranging from a hundred meters to a few kilometres. In densely served areas, such as the peri-urban zone, the coverage areas of the towers overlap several times.

One of the consequences is the apparent hopping between municipalities: this occurs when a non-mobile user with a designated location close to the municipal boundary generates events on the towers assigned to one or the other municipality, depending on the utilisation of the towers. *Figure 1.* highlights the set of settlements located right next to the border of the municipality of Budapest, where a high number of foreign satellite travellers seemingly spent a

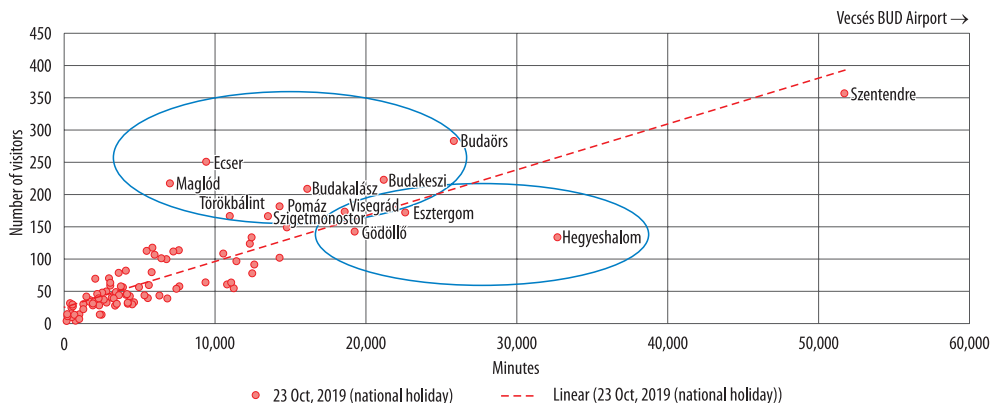


Fig. 1. Number of satellite travellers and time spent in each municipality on 23 October 2019 (national holiday). Source: Authors’ own research.

limited amount of time. The reason behind this is the previously defined oscillation along the border region. In this case, our data show that the user may apparently cross the Budapest boundary several times without actually moving. This may result in incorrectly assigning a user to one or another municipality based on the events, and, as a result, falsely defining a user as a satellite traveller. We carefully considered removing the subset of adjacent locations from the analysis. As a result of the delayed and congested stages of urban development of the post-socialist era, some of the traditional cultural and economic centres of the urban periphery – such as Szentendre and Gödöllő – have been incorporated into the functional metropolitan area. Because of the functional diversity and architectural heritage, some adjacent centres may be satellite tourism destinations based on their merits (FABULA, Sz. et al. 2021). Therefore, removing the affected settlements from the analysis may imply a significant loss of data which would mask peculiar phenomena in an early research stage. We decided to keep the integrity of the initial dataset and carefully draw attention to the limitation of the methods applied.

As we can see in Figure 1, a strong positive linear correlation was observed, and municipalities fit the linear trend line. Vecsés, which accommodates Budapest Ferenc Liszt International

Airport (IATA: BUD), was an outlier in terms of the number of visitors and time spent. The airport’s outstanding satellite traffic is due to its peripheral location at the border between the city and the agglomeration. The same phenomenon occurred in the settlements at the city border: events were handled by towers located in both the agglomeration settlements and Budapest, making visitors’ locations seem to oscillate on the city-urban periphery border.

All these uncertainties are pervasive for telecommunication big data sources, and indeed big data in general. Even so, the granularity, scope, frequency and representativity of the MTelekom dataset exceed most available data sources. This is because individual mobility histories are not even available for research purposes under the Hungarian corporate legal interpretation since the General Data Protection Regulation (2018) entered into force.

### Spatial features of satellite tourism in the Budapest Metropolitan Region

#### Mobility formula for satellite tourism at the municipal level

We elaborated upon a mobility model of satellite tourism at the municipal level using

minute-based location records and standard speed when calculating individual movement. Events were recorded at telecommunication towers in the form of CDR data. This dataset was complemented by the Customer Relationship Management (CRM) data generated by the service provider MTelekom, which captured users' demographics, subscription and device information. Only the country of subscription and device data were recorded for non-Hungarian users. If the service provider detected a non-Hungarian user participating in satellite tourism in the same municipality other than Budapest on two consecutive occasions, the time elapsed between the two events was attributed to that user ( $T_{1,2}(i) = t_1(i)$ ), i.e. it was assumed that between the two events the user stayed at the municipality. If the user moved between two events, the airline distance between the geometric centroids ( $S_1, S_2$ ) of the coverage areas was defined as the displacement vector ( $v_1$ ). The user's individual mobility history was composed of a series of vectors ( $v_{1,2}(i)t_{1,2}, v_{2,3}(i)t_{2,3} \dots v_{n-1,n}(i)t_{n-1,n}$ ), summarised on a daily basis. In addition to the calculated values of the displacement vector, a record was made when the user continued to move from the previously registered settlement ( $L_1$ ) to the municipality registered after that ( $L_2$ ). In this case  $T_1(i)L_1, T_2(i)L_2 \rightarrow v_{1,2}(i)t_{1,2}$ , where  $v_{1,2}$  corresponds to the displacement, and  $t_1$  is the time elapsed between events (event-minutes).

The mobility model was designed to account for users who spend, from a tourism point of view, the relevant amount of time in the location. Therefore, we needed to filter out transit users in each location. To do this, we introduced a standard displacement speed set at 60 km/h due to airline movements. Knowing the speed and the displacement vector  $v_{1,2}$  the time spent travelling (travel-minutes,  $u_1(i)L_{1,2}$ ) could be estimated. Given a location  $L_1$ , the estimated time spent in the location (length of stay,  $t_1'$ ) is equal to the difference between the time spent between the events and the time spent travelling. The estimated time a user potentially spends in each settlement for tourism

purposes, therefore, equals the time elapsed between the event logs in the two various places minus the time spent travelling:

$$t_n'(i)L_n = t_n(i)L_{n-1,n} - u_n(i)L_{n-1,n}$$

The lengths of stays calculated in this way were allocated to the municipalities concerned in equal proportions per user, i.e. half to  $L_1(i)$ , and a half to  $L_2(i)$ . We then summed up the estimated length of stay frequencies for each day, i.e. we determined how many users took up each length of stay value.

We aggregated the number of users and lengths of stays on the selected dates separately and then created three groups by simple weighted division into thirds. One-third of the users spent 1–12 minutes, another third spent 13–66 minutes and the remaining third spent more than 67 minutes (max. 1,281–1,440 minutes) in the municipality concerned. For these three groups of lengths of stays, we mapped the daily distribution of satellite travellers by the municipality. In the first group, transit visitors, who touched the municipality during their daily movements, were accounted for. The second group included satellite travellers who stopped in the municipality for a short period, for instance for resting, refuelling, shopping, etc. The third group included the satellite travellers we want to account for, who spend a longer period of time in a settlement before returning to Budapest.

#### *Interpretation of the mobility formula by introducing cluster analysis*

In order to understand the real-life implications of the generalised mobility model, we introduced three spatial variables: distance from motorways, distance from industrial parks and distance from Budapest (Table 1). For each variable, the distance was given in linear distance calculated as the distance from the nearest motorway, the nearest industrial area and the distance from the Budapest geometric centre to the geometrical centre of the municipality concerned. The dis-

Table 1. Statistical parameters of the variables included in the explanatory model of K-means clustering (N = 3,154)

Per settlement		Range (= Maximum)	Sum	Mean	Std. deviation	Variance
<i>Minutes spent, total, 15 March</i>		90,515	635,899	202	1,930	3,725,047
of which	satellite transit (1–12 minutes)	3,026	12,929	4	56	3,094
	short stays (13–66 minutes)	22,288	77,315	25	406	165,169
	satellite tourists (67–1,281 minutes)	65,201	545,656	173	1,525	2,324,649
<i>Pieces of equipment, total, 15 March</i>		1,547	7,245	2	29	824
of which	satellite transit (1–12 minutes)	467	2,444	1	9	75
	short stays (13–66 minutes)	712	2,384	1	13	168
	satellite tourists (67–1,281 minutes)	368	2,417	1	8	58
<i>Minutes spent, total, 18 March</i>		109,261	712,985	226	2,377	5,650,026
of which	satellite transit (1–12 minutes)	2,920	14,145	4	56	3,116
	short stays (13–66 minutes)	25,136	96,222	31	474	224,805
	satellite tourists (67–1,281 minutes)	81,205	602,618	191	1,887	3,559,734
<i>Pieces of equipment, total, 18 March</i>		1,758	8,342	3	34	1,133
of which	satellite transit (1–12 minutes)	439	2,570	1	9	73
	short stays (13–66 minutes)	807	3,001	1	15	229
	satellite tourists (67–1,281 minutes)	512	2,771	1	10	108
<i>Minutes spent, total, 20 August</i>		82,762	689,847	219	1,988	3,952,840
of which	satellite transit (1–12 minutes)	2,260	15,499	5	46	2,129
	short stays (13–66 minutes)	19,781	85,032	27	377	141,772
	satellite tourists (67–1,281 minutes)	60,721	589,317	187	1,623	2,633,575
<i>Pieces of equipment, total, 20 August</i>		1,302	8,671	3	27	716
of which	satellite transit (1–12 minutes)	338	3,088	1	7	55
	short stays (13–66 minutes)	622	2,592	1	12	138
	satellite tourists (67–1,281 minutes)	342	2,991	1	9	79
<i>Minutes spent, total, 26 August</i>		135,446	796,259	252	2,846	8,097,619
of which	satellite transit (1–12 minutes)	2,951	16,665	5	59	3,434
	short stays (13–66 minutes)	31,689	110,427	35	590	348,172
	satellite tourists (67–1,281 minutes)	100,806	669,168	212	2,239	5,014,714
<i>Pieces of equipment, total, 26 August</i>		2,024	9,762	3	39	1,517
of which	satellite transit (1–12 minutes)	437	3,100	1	9	82
	short stays (13–66 minutes)	982	3,415	1	18	334
	satellite tourists (67–1,281 minutes)	605	3,247	1	12	151
<i>Minutes spent, total, 23 October</i>		101,435	880,427	279	2,520	6,351,869
of which	satellite transit (1–12 minutes)	3,052	19,844	6	64	4,068
	short stays (13–66 minutes)	23,189	105,878	34	446	198,645
	satellite tourists (67–1,281 minutes)	75,194	754,705	239	2,090	4,368,360
<i>Pieces of equipment, total, 23 October</i>		1,674	10,679	3	34	1,176
of which	satellite transit (1–12 minutes)	492	3,759	1	11	113
	short stays (13–66 minutes)	739	3,241	1	14	199
	satellite tourists (67–1,281 minutes)	443	3,679	1	11	124
<i>Minutes spent, total, 28 October</i>		134,741	822,807	261	2,926	8,562,985
of which	satellite transit (1–12 minutes)	3,156	16,298	5	65	4,219
	short stays (13–66 minutes)	29,507	111,871	35	560	313,206
	satellite tourists (67–1,281 minutes)	102,078	694,638	220	2,349	5,519,445
<i>Pieces of equipment, total, 28 October</i>		2,017	9,634	3	40	1,570
of which	satellite transit (1–12 minutes)	490	2,967	1	10	109
	short stays (13–66 minutes)	920	3,416	1	17	303
	satellite tourists (67–1,281 minutes)	607	3,251	1	13	162
<i>Distance from motorways, km</i>		16	8,537	3	2	4,078
<i>Distance from Budapest, km</i>		288	457,334	145	58	3,377,982
<i>Distance from industrial areas, km</i>		34	31,116	10	6	33,911

tance from motorways was introduced into the explanatory model as a type of urbanisation indicator. Our preliminary expectation was that the destinations preferred by foreign visitors are necessarily equipped with urban services, i.e. they are also attractive to international tourists in terms of the quality of service. The distance from Budapest was assumed to be an essential variable for satellite tourism. Still, precisely because of the development of the motorway network, there was a narrow range of potential destinations that were generally excluded from the daily visitor flow due to distance alone.

The distance from industrial parks was calculated using land use (OSM Landuse Landcover) data. 9,209 industrial land use sites were mapped in the whole country, with an average site area of 0.13 km<sup>2</sup>. Our analysis included only medium and large industrial sites greater than 0.5 km<sup>2</sup> in size. A total of 200 industrial sites were selected across the country. The presence of industrial sites with a larger area was interpreted as an indicator of production activity in the municipality. Industrial production was assumed to be a tool for economic prosperity, especially in municipalities with less tourist attraction. Therefore, we expected an inverse correlation between the proximity of industrial parks and the number of visitors to municipalities involved in satellite tourism.

We examined the correlation between the spatial structural indicators introduced in the model, such as the distance from motorways, industrial areas and the Budapest city centre, and the satellite traveller flow indicators, i.e. the number of visitors spending longer periods and total time spent in the settlement (Table 2). Contrary to preliminary expectations, Budapest's proximity proved to have no impact on satellite tourism. Similarly, no correlation was detected between motorway access and satellite tourism. However, industrial areas showed a weak, significant negative correlation with non-Hungarian satellite travellers' mobility: the more attraction a municipality holds, the less the presence of industrial areas close to the municipality.

This correlation suggests that the integrity of tourist attractions within the residential urban fabric determines the appeal for foreign satellite travellers. It may also imply that settlements with a valuable heritage and appealing attractions have given less land area for industrialisation and logistics. If they have, these areas have been located at a suitable distance from tourism destinations of international interest. The result that the spatial dispersion of satellite traveller traffic does not overlap with the geographical distribution of industrial production also serves to justify our methodology. Theoretically, we could incorrectly identify a non-Hungarian employee living in Budapest and working in the agglomeration zone as a satellite traveller. However, industrial areas' proximity would positively correlate with visitor flow in this case. Thus, according to our definition, there is a high probability that the subset of non-Hungarian visitors filtered from the data excludes non-Hungarian commuting traffic for employment purposes.

Finally, K-means clustering was used to identify subsets of municipalities with similar characteristics based on the three correlated variables (distance from industrial areas, minutes spent, and the number of visitors – Table 3), but which differ significantly from the "behaviour" of other clusters. The result was a four-tiered typology of settlements grouped according to their role in satellite traffic. The vast majority of municipalities could be grouped into two clusters, which were uniformly unimportant in terms of visitor traffic but differed in economic nature from each other. In the third cluster, municipalities such as Vecsés (BUD) and Szentendre were the most important destinations for non-Hungarian satellite travellers. Finally, the fourth cluster included a reasonably narrow range of municipalities, mainly in the Danube bend and the agglomeration, with a few rural locations.

Watching the cluster-membership of municipalities (Figure 2), four major trends can be identified when looking at the spatial distribution of non-Hungarian daily satellite visitors:

Table 2. Co-movement of variables: correlation coefficient among the spatial-structural variables\*

Per settlement		Distance from		
		motorways	Budapest	industrial areas
		Pearson correlation		
<i>Minutes spent, total, 15 March</i>		-.067	.014	-.092
of which	satellite transit (1–12 minutes)	-.045	.021	-.060
	short stays (13–66 minutes)	-.037	.018	-.051
	satellite tourists (67–1,281 minutes)	-.073	.012	<b>-.101</b>
<i>Pieces of equipment, total, 15 March</i>		-.050	.020	-.066
of which	satellite transit (1–12 minutes)	-.054	.023	-.067
	short stays (13–66 minutes)	-.036	.018	-.051
	satellite tourists (67–1,281 minutes)	-.064	.017	-.086
<i>Minutes spent, total, 18 March</i>		-.073	.016	<b>-.102</b>
of which	satellite transit (1–12 minutes)	-.054	.027	-.072
	short stays (13–66 minutes)	-.047	.024	-.067
	satellite tourists (67–1,281 minutes)	-.079	.014	<b>-.110</b>
<i>Pieces of equipment, total, 18 March</i>		-.056	.024	-.076
of which	satellite transit (1–12 minutes)	-.064	.031	-.079
	short stays (13–66 minutes)	-.046	.023	-.064
	satellite tourists (67–1,281 minutes)	-.063	.018	-.088
<i>Minutes spent, total, 20 August</i>		-.085	.019	-.100
of which	satellite transit (1–12 minutes)	-.074	.027	-.088
	short stays (13–66 minutes)	-.051	.024	-.064
	satellite tourists (67–1,281 minutes)	-.091	.016	<b>-.106</b>
<i>Pieces of equipment, total, 20 August</i>		-.075	.026	-.087
of which	satellite transit (1–12 minutes)	-.091	.033	-.100
	short stays (13–66 minutes)	-.050	.024	-.063
	satellite tourists (67–1,281 minutes)	-.083	.019	-.095
<i>Minutes spent, total, 26 August</i>		-.071	.017	-.094
of which	satellite transit (1–12 minutes)	-.069	.027	-.085
	short stays (13–66 minutes)	-.045	.020	-.061
	satellite tourists (67–1,281 minutes)	-.076	.015	<b>-.101</b>
<i>Pieces of equipment, total, 26 August</i>		-.061	.022	-.079
of which	satellite transit (1–12 minutes)	-.081	.030	-.096
	short stays (13–66 minutes)	-.045	.021	-.067
	satellite tourists (67–1,281 minutes)	-.066	.017	-.090
<i>Minutes spent, total, 23 October</i>		-.088	.024	<b>-.112</b>
of which	satellite transit (1–12 minutes)	-.075	.029	-.092
	short stays (13–66 minutes)	-.057	.022	-.070
	satellite tourists (67–1,281 minutes)	-.092	.023	<b>-.117</b>
<i>Pieces of equipment, total, 23 October</i>		-.076	.025	-.093
of which	satellite transit (1–12 minutes)	-.084	.031	-.100
	short stays (13–66 minutes)	-.056	.021	-.069
	satellite tourists (67–1,281 minutes)	-.083	.021	<b>-.103</b>
<i>Minutes spent, total, 28 October</i>		-.075	.019	-.100
of which	satellite transit (1–12 minutes)	-.066	.022	-.082
	short stays (13–66 minutes)	-.051	.025	-.068
	satellite tourists (67–1,281 minutes)	-.079	.017	<b>-.106</b>
<i>Pieces of equipment, total, 28 October</i>		-.063	.024	-.082
of which	satellite transit (1–12 minutes)	-.074	.025	-.089
	short stays (13–66 minutes)	-.050	.025	-.067
	satellite tourists (67–1,281 minutes)	-.067	.020	-.090
<i>Distance from motorways</i>		1.000	-.007	.228
<i>Distance from Budapest</i>		-.007	1.000	-.004
<i>Distance from industrial areas</i>		.228	-.004	1.000

\*Distance from motorways, from Budapest and industrial areas, and satellite tourism metrics, such as the number of visitors and tourism time spent on various days. Significance level (2-tailed) = 0.0000. Variable are significant at 5% level.

Table 3. K-means clustering scoreboard, 23 October 2019, for visitors who spent more than 67 minutes in each municipality\*

Indicators	Final cluster centres			
	Rural areas	Peri-urban areas	Points of interest of satellite tourism	Urban satellite destinations
	not affected by satellite tourism			
Distance from industrial areas, km	16.40	6.50	3.10	2.60
Time spent, minutes	31.84	128.36	62,100.25	12,811.87
Number of visitors	0.18	0.62	352.50	58.46

\*The municipalities were clustered into four types: two rural types of municipalities not affected by visitor traffic (cluster 1: rural, not affected, and cluster 2: peri-urban areas, not affected), one highly visited, industrialised type (cluster 3: hot spots), and one urbanised type, attracting high-scale satellite traffic (cluster 4: urban satellite).

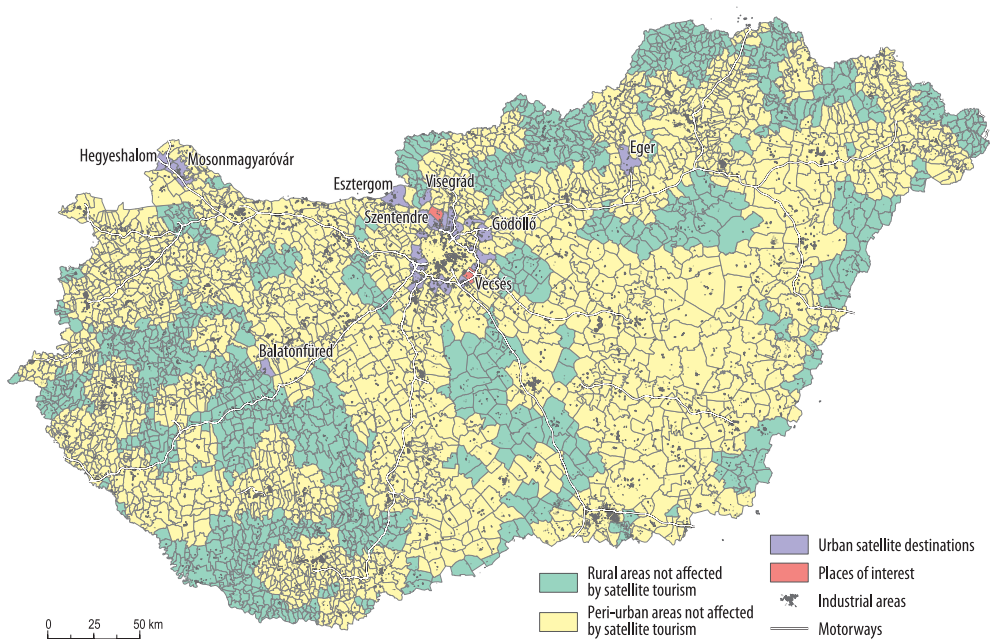


Fig. 2. Cluster membership of municipalities regarding to international visitors on 23 October 2019. Source: Authors' own research.

The most explicit and substantial traffic is heading towards the Danube Bend, with Szentendre, Visegrád and Esztergom being the main destinations. Many non-Hungarian visitors come here for longer stays.

The Budapest Metropolitan Region attracts high-scale visitor traffic, with Vécse, as the air-

port's host municipality, standing out by far. The extreme visitor traffic flow evolves from peripheral locations, as the airport facility is supported by various towers both registered in Budapest and in the neighbouring municipalities around the airport. The visitors identified as taking part in satellite tourism in this local-

ity do not actually return to Budapest; their movements are apparent because they are occasionally served by Budapest towers, but their location remains unchanged in the vast majority of cases. This phenomenon of ‘apparent moving’ results in the peaking traffic of the agglomeration municipalities. The over-representation of agglomeration municipalities is an outcome of technological limitation (network load-optimised service delivery).

Non-Hungarian visitors are heading towards the Western border of Hungary (Hegyeshalom, Mosonmagyaróvár) that incorporates the daily visitor flows to Austria and Slovakia, and reflects the daily city tours to Vienna and Bratislava. The large number of long stays at the border area is also apparent, since in fact the signals disappear at the border, but our method assumes a stop between the event traffic in the outbound and inbound directions. An indication of this is that we have assigned to border crossing a small number of visitors with very long stays. If data collection methods would enable tracking events beyond borders, the significance of the border-crossing settlements would immediately be reduced to a fraction, as visitors would appear elsewhere between two logins at the border area.

The tourist attractions Eger and Lake Balaton are also key contributors to visitor traffic, with Balatonfüred as main destinations for non-Hungarian satellite tourism flow, with some significant seasonal variations.

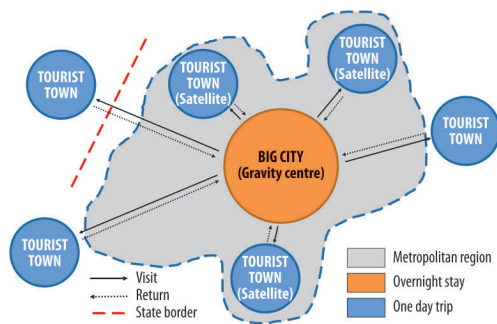


Fig. 3. Model of satellite tourism. Source: Authors' own design.

## Discussion and conclusions

Satellite tourism is a phenomenon to be discussed under the umbrella of unconventional tourism mobility, which by nature is difficult to track because tourist consumption is not fulfilled, and the presence of tourists can be detected temporarily but is difficult to register (BELOTTI, S. 2019; TIMOTHY, D. et al. 2022). The significant daytime tourist traffic in the agglomeration of large cities is rarely matched by the use of local accommodation services, so the tourism-based economy is one-sided, with moderate development in the accommodation sector and without the development of the night-time economy. Tourism receipts from leisure activities are mainly generated in agglomeration settlements, while the receipts from outward and return journeys to the big cities and overnight stays are mainly generated in central cities. The city's gravitational pull is due to its excellent international and domestic transport links, diversified accommodation, hospitality and retail offerings, and colourful leisure activities. After a while, or in the case of repeat visitors (FREYTAG, T. 2010), travellers of big cities become saturated with local experiences, and begin looking for a new impulse, which they can experience either in an individual or organized way in the agglomeration zone.

Based on our investigation of tourism mobility using mobile phone data, we have been able to define a model of satellite tourism (Figure 3). The novelty of the model is that it interprets the notion of satellite tourism not only in terms of flows to the settlements traditionally surrounding a metropolis, but also integrates mobility outside the agglomeration and even beyond the national border for less than 24 hours. The model offers a new theoretical framework for understanding the tourist flows in towns involved in same-day visits because it describes a system of mobility between origin and destination settlements. As the studies on same-day visits have so far focused on destinations, mainly on the consumer behaviour of day trippers and its social, economic, and environmen-

tal impacts, the model can contribute to broadening the horizon of future investigations (BAUDER, M. and FREYTAG, T. 2015; BOZONELOS, D. 2020). Understanding the motivations behind tourists returning within 24 hours will help to better outline tourism development in the areas concerned (SURINACH, J. et al. 2017). Mobile phone data can be very helpful in better understanding the mobility of satellite travellers, but the limitations of systematic observations using the same methodology mean that further procedural improvements are essential.

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## Regional economic growth and unemployment in the European Union – a spatio-temporal analysis at the NUTS-2 level (2013–2019)

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### Abstract

The study aims to verify the relationship between the unemployment rate and economic growth in European Union (EU) regions. As the most important macroeconomic relationship, the significance of the dependence between the labour market situation and the output growth is widely known and considered. Analysis in this research was conducted using data for 229 EU regions on the NUTS-2 level in the years 2013–2019. In order to verify the relationship between the unemployment rate and the output growth, the spatio-temporal models for pooled time series and cross-sectional data (TSCS) were estimated. The Fitted Trend and Elasticity Method of verifying Okun's law was used in the analysis, wherein the deterministic trend factor was enriched with the spatial element. Educational attainment as the additional explanatory variable was included in the models. The neighbourhood between regions was quantified based on two criteria: (1) common border criterion – related to the possibility of population migrations, and (2) similarity of the unemployment rate criterion – related to the imitation effect in the issue of introduced rules and regulations on the labour market by regional governments. One of the hypotheses verified in the investigation is the superiority of the economic neighbourhood over the geographical neighbourhood.

**Keywords:** economic growth, European Union, Okun's law, spatio-temporal models, unemployment rate

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### Introduction

The problem of unemployment is one of the essential issues in macroeconomic analyses. This is widely known that the persistent regional unemployment disparities in the European Union occur (PATUELLI, R. *et al.* 2012; HALLECK VEGA, S. and ELHORST, J.P. 2016) Increasing the number of unemployed persons is a problem in both developing and developed regions. A lot of determinants significantly influence the regional unemployment disparities. For example, regional demand and supply factors, the labour migration (ANDREWS, R. 2015; LADOS, G. and HEGEDŰS, G. 2016) and amenities are the most important factors. Positive changes in these factors can disincentive to migration, compensating for relatively high unemploy-

ment rates (Rios, V. 2017). Moreover, the institutional decisions providing restrictions or incentives influence the individual decisions regarding labour demand, supply and wages paid, which changes the level of the unemployment rate (BOERI, T. 2011). Capital inadequacy can influence the decrease in the employed people above all in the developing countries. In turn, technological progress is the primary reason for the increased unemployment rate in developed regions (SOYLU, Ö.B. *et al.* 2018). Moreover, the national labour market regulation and labour market institutional system play significant role in the creation of unemployment rate in every economy. Whereas, as the most important determinant of unemployment, economic growth is pointed out. Arthur M. OKUN proved the negative relationship between

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the unemployment rate and Gross National Product (GNP) based on the data for the United States (US) in the years 1947–1960 (OKUN, A.M. 1963). He concluded that each 1 percent increase in GNP led to a 0.3 percent decrease in the unemployment rate.

Since that time, the relationship between the unemployment rate and economic growth has been widely concerned in macroeconomic analyses. This negative short-run dependence is known as Okun's law. Previous studies conclude that the relationship formulated by OKUN is stable in many countries (BALL, L. *et al.* 2017) and possible instability is visible in terms of the economic slowdown (CAZES, S. *et al.* 2011). In turn, in some studies, authors concluded that the discrepancy in Okun's relationship between regions within one country occurs (ADANU, K. 2005; BINET, M. and FACCHINI, F. 2013; DURECH, R. *et al.* 2014).

There are three methods of verifying Okun's relationship: (1) Trial Gaps Method, (2) First Differences Method, and (3) Fitted Trend and Elasticity Method (BARRETO, H. and HOWLAND, F. 1993). The first two methods treated analysed processes as the processes stationary in the variance. Instead, within the meaning of the third method, processes are stationary in the average. The First Differences Method is characterized by the greatest popularity in previous studies. In this research, the Fitted Trend and Elasticity method is used, but the deterministic trend factor is enriched with the spatial element (originally, only time tendency was considered).

In this study, the relationship between the unemployment rate and its main determinants – economic growth and educational attainment – is analysed. The study's main aim is to show that the economic growth and unemployment rate are significantly related in European Union regions. Moreover, the stronger importance of economic similarity between territorial units than their near geographical location in the considered relationship is verified. As a space and time range of the research, the NUTS-2 European Union regions in the years 2013–2019 were chosen

(due to lack of data for the unemployment rate, Croatian regions were omitted). In the verification of the mentioned relationship, the spatial and spatio-temporal dependencies were included. Many researchers pointed out the importance of spatial connections in the unemployment rate analyses (OVERMAN, H. *et al.* 2002; PATACCHINI, E. and ZENOU, Y. 2007; HALLECK VEGA, S. and ELHORST, J.P. 2016). In this study, two types of neighbourhood connections were considered. The first is the geographical neighbourhood (associated with the possibility of migration), and the second is the economic neighbourhood (associated with the unemployment rate similarity). Two research hypotheses were verified in this investigation: (1) Output growth and education have a significant positive impact on the labour market conditions in the EU regions, and (2) Economic similarity of regions is more important than a geographical neighbourhood in the formation of Okun's relationship.

There are many studies considering Okun's relationship at the regional level, and different methods are used in order to verify it. A couple of studies pertain to Okun's relationship in the Spanish provinces (VILLAVERDE, J. and MAZA, A. 2007, 2009; CLAR-LOPEZ, M. *et al.* 2014; CHÁFER, C.M. 2015; BANDE, R. and MARTÍN-ROMÁN, Á. 2018; GUISINGER, A.Y. *et al.* 2018; CUTANDA, A. 2023). All of these investigations are based on non-spatial analysis, and only VILLAVERDE, J. and MAZA, A. (2007) considered the Fitted Trend and Elasticity Method with the quadratic trend. BANDE, R. and MARTÍN-ROMÁN, Á. (2018) estimated a simple model for the first differences of processes and also for trial gaps. The same method of research took CLAR-LOPEZ, M. *et al.* (2014). The subject of the investigations in terms of the relationship between unemployment rates were also regions from other European countries, e.g., Italian provinces (SALVATI, L. 2015), Finnish regions (KANGASHARJU, A. *et al.* 2012), Greek regions (APERGIS, N. and REZITIS, A. 2003), and also Czech and Slovak regions (DURECH, R. *et al.* 2014). Most of these studies underline the regional disparities in the unemploy-

ment rate formation rely on their economic development. In turn, YERDELEN, F. and İÇEN, H. verified Okun’s relationship for NUTS-2 level regions from 20 European countries using panel data models (YERDELEN, F. and İÇEN, H. 2019). Apart from the studies for European countries, it is possible to find analyses of the mentioned relationship at the regional level in the United States (HUANG, H.C. and YEH, C.C. 2013; GUISSINGER, A.Y. *et al.* 2018), Canada (ADANU, K. 2005), Indonesia (SASONKO, G. *et al.* 2020), and South Africa (KAVESE, K. and PHIRI, A. 2020).

The spatial factor in the analysis of the dependence between the unemployment rate and output growth is also included in previous studies. DURAN, H.E. considered this dependence using spatial panel data models using data for 26 Turkish NUTS-2 regions (DURAN, H.E. 2022). Spatial regression models were used in the analyses concerning the unemployment rate in the United States (MONTERO-KUSCEVIC, C.M. 2011; PERREIRA, R.M. 2013), and EU15 NUTS-2 regions (HERWARTZ, H. and NIEBUHR, A. 2011). In turn, Adolfo MAZA conducted the analysis for the widest space range in the mentioned relationship (MAZA, A. 2022). He considered the unemployment rate in 265 European regions between 2000 and 2019.

**Methodology**

In this research, spatial econometric methods were used in order to verify the Okun’s relationship. Spatial econometric models contain the influence of process changes in the neighbouring regions on the same process in the established region. In the regional analyses, connections between nearby and also similar (in the economic context) units are very important, in particular in case of the unemployment analysis. The economic conditions and possibilities of the neighbours can encourage people to jobs migrations, changing the labour situation in the considered unit.

In the first part of the investigation, the spatio-temporal structure of processes was

analysed. The structure is composed of the spatio-temporal trend and spatio-temporal autocorrelation. Initially, spatio-temporal trend models were considered, which general form is as follows (CRESSIE, N.A.C. 1993):

$$P(s_i, t) = \sum_{k=0}^p \sum_{m=0}^p \sum_{l=0}^p \theta_{kml} x_i^k y_i^m t^l, \tag{1}$$

where  $s_i = [x_i, y_i]$  denotes unit’s location coordinates on the plane (longitude and latitude, respectively),  $i = 1, 2, \dots, N$  are indexes of spatial units, and  $p$  means the polynomial trend degree ( $k + m + l \leq p$ ) but  $t$  indicates time.

Simultaneously, the spatio-temporal autocorrelation presence as the second element of the spatio-temporal structure was checked. The spatial autocorrelation is tested using Moran statistics, which takes the following form (MORAN, P.A.P. 1948; SCHABENBERGER, O. and GOTWAY, C.A. 2005):

$$I = \frac{1}{\sum_{i=1}^n \sum_{j=1}^n w_{ij,t}} \cdot \frac{\sum_{i=1}^n \sum_{j=1}^n w_{ij,t} [y_{i,t} - \bar{y}][y_{j,t} - \bar{y}]}{\frac{1}{n} \sum_{i=1}^n [y_{i,t} - \bar{y}]^2} = \frac{n}{S_0} \cdot \frac{z^T W^* z}{z^T z}. \tag{2}$$

where  $y_{i,t}$  is the observation of the process in the  $i^{\text{th}}$  region in time  $t$ ,  $\bar{y}$  denotes the average value of the process,  $W^*$  is the block matrix of spatio-temporal connections between units given as SZULC, E. and JANKIEWICZ, M. (2018):

$$W^* = [w_{ij,t}]_{NT \times NT} = \begin{bmatrix} W_1 & 0 & \dots & 0 \\ 0 & W_2 & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & W_T \end{bmatrix}, \tag{3}$$

wherein  $W_1 = W_2 = \dots = W_T$  are standard spatial connectivity matrices quantified for a certain year. In this study, these matrices are the same for all years.

In this research, two types of row-standardized to unity matrices were adopted. The first of them is based on the common border criterion (marked as  $W$ ). Therefore, two regions are neighbours if they have a common land border. In turn, the second defines the neighbourhood as the economic similarity ( $D$ ) – regions are neighbours if the difference between their unemployment rate level in the last year of the investigation does not exceed a certain specific value (established as 0.8% – the 15<sup>th</sup> percentile of differences between the unemployment rate in all regions). The procedure of building the economic dis-

tance matrix is presented by JANKIEWICZ, M. and SZULC, E. in their study (JANKIEWICZ, M. and SZULC, E. 2021).

Statistically significant Moran’s *I* coefficient signalizes the presence of spatial autocorrelation. Its positive value denotes that territorial units create clusters of the regions with a similar level of the analysed phenomenon. In turn, the negative sign of statistics points out that neighbouring regions are characterized by different values of the considered process. Non-significant statistics testifies to a random distribution of the process values in space.

Next, the spatio-temporal models of the relationship between the unemployment rate, economic growth, and educational attainment were considered. The general form of the TSCS model (pooled time series and cross-sectional data model) is as follows:

$$Y_{i,t} = \beta_1 X_{1i,t} + \beta_2 X_{2i,t} + \varepsilon_{i,t}, \tag{4}$$

where  $Y_{i,t}$  denotes the unemployment rate in the  $i^{\text{th}}$  region in time  $t$ ,  $X_{1i,t}$  and  $X_{2i,t}$  are levels of Gross Domestic Product per capita and educational attainment, respectively (all expressed in natural logarithms). In turn,  $\varepsilon_{i,t}$  indicates the spatio-temporal random component, but  $\beta_1$  and  $\beta_2$  are the structural parameters. Logarithms of variables cause that parameter  $\beta_1$  is the elasticity parameter in the Fitted Trend and Elasticity Method in the Okun’s law verification. Model (4) is deprived of constant due to all considered variables are filtered out from deterministic spatio-temporal trend, which is responsible for their average values.

In terms of global spatial autocorrelation in the residuals of the model (4) the character of the spatial dependence was determined using Lagrange Multiplier (*LM*) tests in the basic and robust version (ANSELIN, L. *et al.* 2004). Including spatially lagged explanatory variables in the models, the spatio-temporal Durbin model (STDM) and spatio-temporal hybrid model (STHM) are given as follows:

$$Y_{i,t} = \beta_1 X_{1i,t} + \beta_2 X_{2i,t} + \rho \sum_{j \neq i} w_{ij,t} Y_{j,t} + \theta_1 \sum_{j \neq i} w_{ij,t} X_{1j,t} + \theta_2 \sum_{j \neq i} w_{ij,t} X_{2j,t} + \varepsilon_{i,t}, \tag{5}$$

$$Y_{i,t} = \beta_1 X_{1i,t} + \beta_2 X_{2i,t} + \theta_1 \sum_{j \neq i} w_{ij,t} X_{1j,t} + \theta_2 \sum_{j \neq i} w_{ij,t} X_{2j,t} + \eta_{i,t}, \tag{6}$$

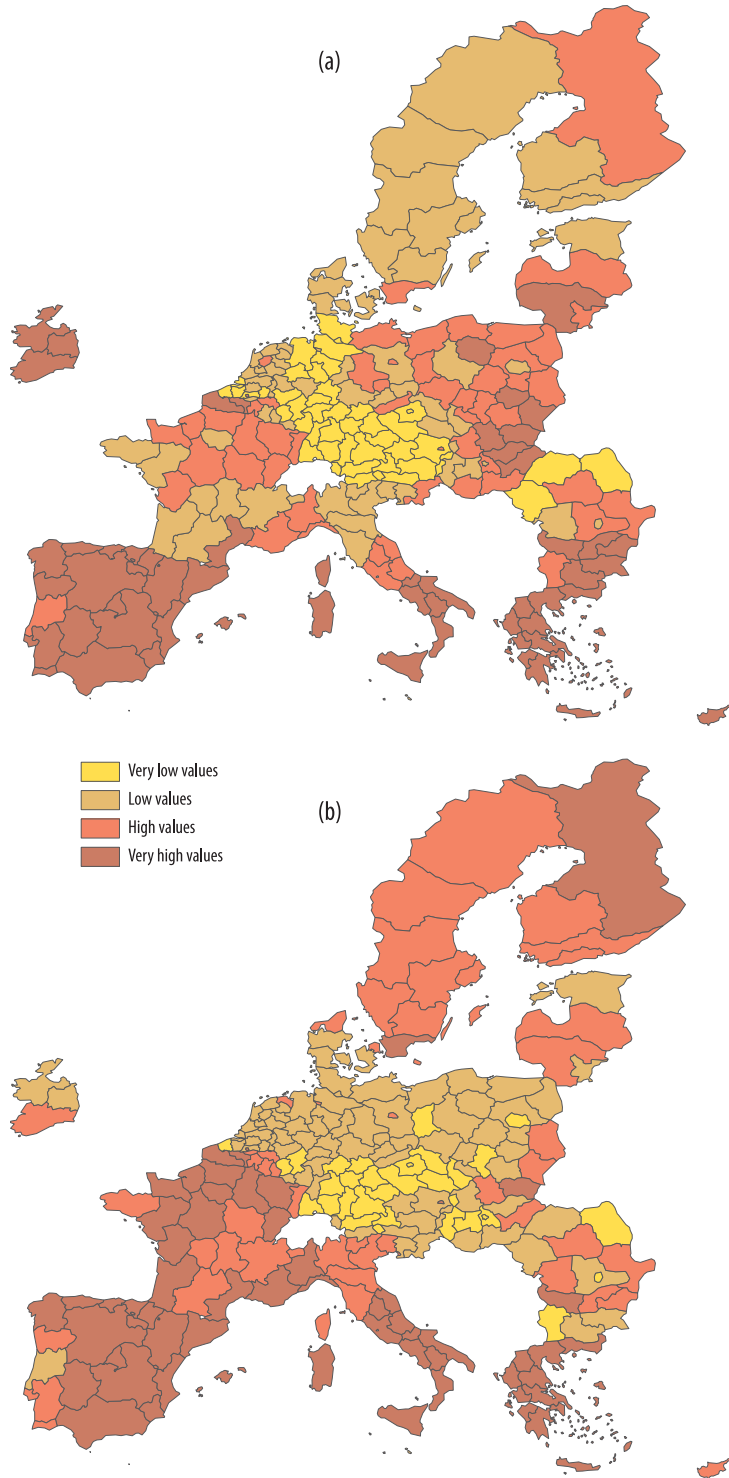
$$\eta_{i,t} = \lambda \sum_{j \neq i} w_{ij,t} \eta_{j,t} + \varepsilon_{i,t},$$

where  $Y_{i,t}$ ,  $X_{1i,t}$ ,  $X_{2i,t}$ ,  $\varepsilon_{i,t}$ ,  $\beta_1$ ,  $\beta_2$  – as above,  $\sum_{j \neq i} w_{ij,t}$ ,  $Y_{j,t}$ ,  $\sum_{j \neq i} w_{ij,t} X_{1j,t}$ ,  $\sum_{j \neq i} w_{ij,t} X_{2j,t}$  – spatially lagged variables,  $\sum_{j \neq i} w_{ij,t} \eta_{j,t}$  – spatially lagged random process,  $\theta_1$ ,  $\theta_2$ ,  $\rho$ ,  $\lambda$  – structural parameters. Parameters  $\rho$  and  $\lambda$  evidence the spatial dependence between neighbouring territorial units.

### Spatial and spatio-temporal structure of processes

Data used in this study concern the unemployment rate (marked as  $Y$ ), Gross Domestic Product per capita ( $X_1$ ), and educational attainment level, understood as the percent of the population that graduated upper secondary and post-secondary (not tertiary) school ( $X_2$ ) in the European Union regions in the years 2013–2019. Better economic conditions in regions favour the creation of new workplaces, whereas the higher education level of society improves chances of getting a job. The indicators used in the research are only a few of many that significantly impact regional unemployment, but they are considered the most important. Apart from them, e.g., the innovation level and the economic structure of regions are important. The first is not included due to data unavailability for the whole considered area, while the second will be of interest for further research. Moreover, in case of unemployment, the age structure of the population and distance from main urban centres play an important role. The established period is the maximum period that can be analysed in light of the data availability. Moreover, due to a lack of data characterizing the unemployment level, Croatia’s regions were omitted. All data come directly from the European Statistical Office (EUROSTAT) database – <https://ec.europa.eu/eurostat/data/database> (accessed: 04.07.2022).

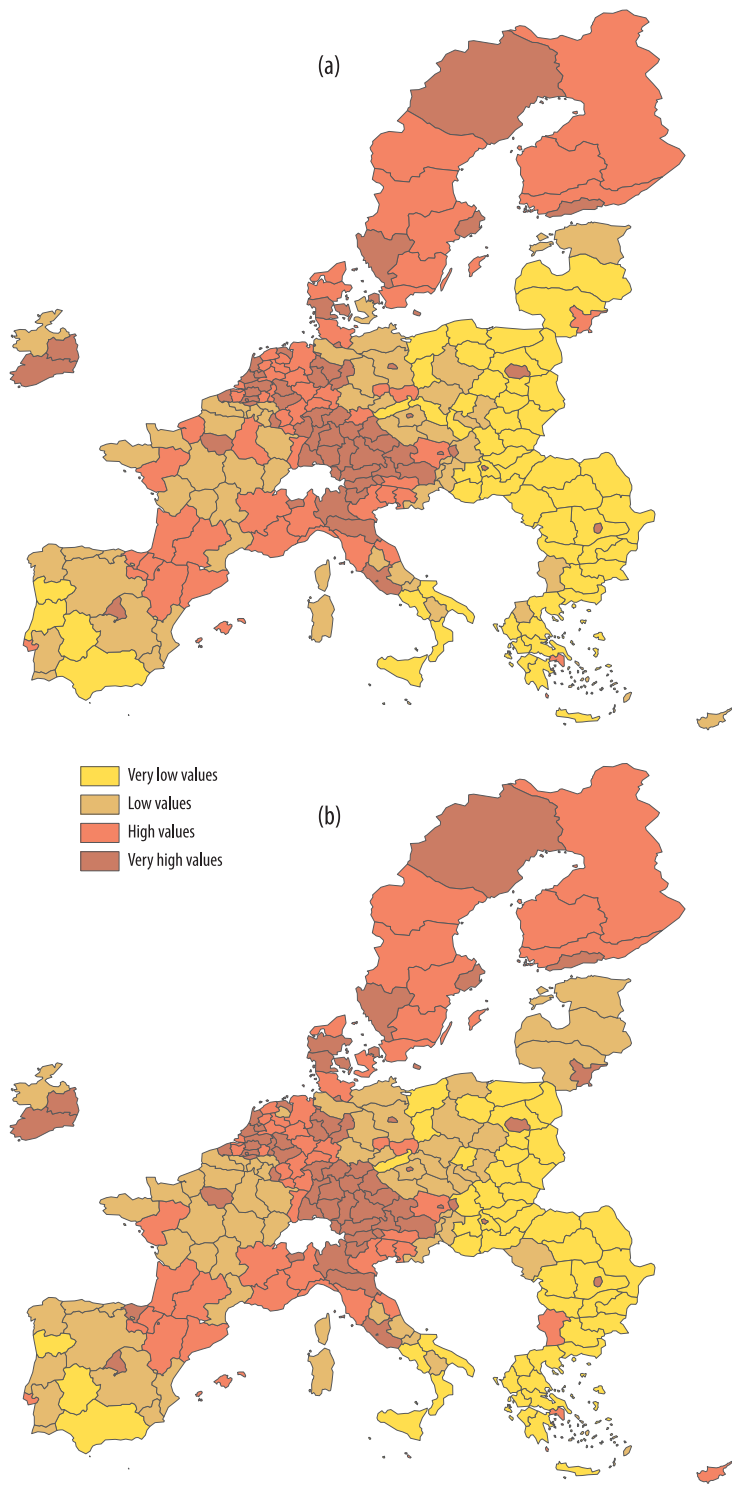
In the first part of the research, spatial distributions of considered processes were presented. These distributions were shown in three figures (for variable  $Y$ , for variable  $X_1$  and for



variable  $X_2$ ) in the extreme years of the analysis. In each figure, part (a) indicates the distribution in 2013, but part (b) refers to spatial differentiation in 2019. EU regions were divided into four groups using positional measures of the descriptive statistics (median and quarter deviation).

As we can see in *Figure 1*, the highest unemployment rate in 2013 was observed in the Iberian Peninsula regions, Greek regions, and the units located in Southern Italy. Moreover, relatively high unemployment was noted in most of Eastern Europe NUTS-2 level regions (above all in the regions located in Lithuania, Poland, and the Slovak Republic). On the other hand, Austrian and West German regions were characterized by the best labour market conditions – the unemployment rate was relatively low. This is worth noting the low level of the considered variable in the North Romanian regions. In 2019 the situation in the labour market in the EU was slightly different than in 2013. The unemployment level in all Francian units was above the median in the last year of the investigation. Instead, the

*Fig. 1.* Spatial distribution of the unemployment rate in EU regions in the years 2013 (a) and 2019 (b)

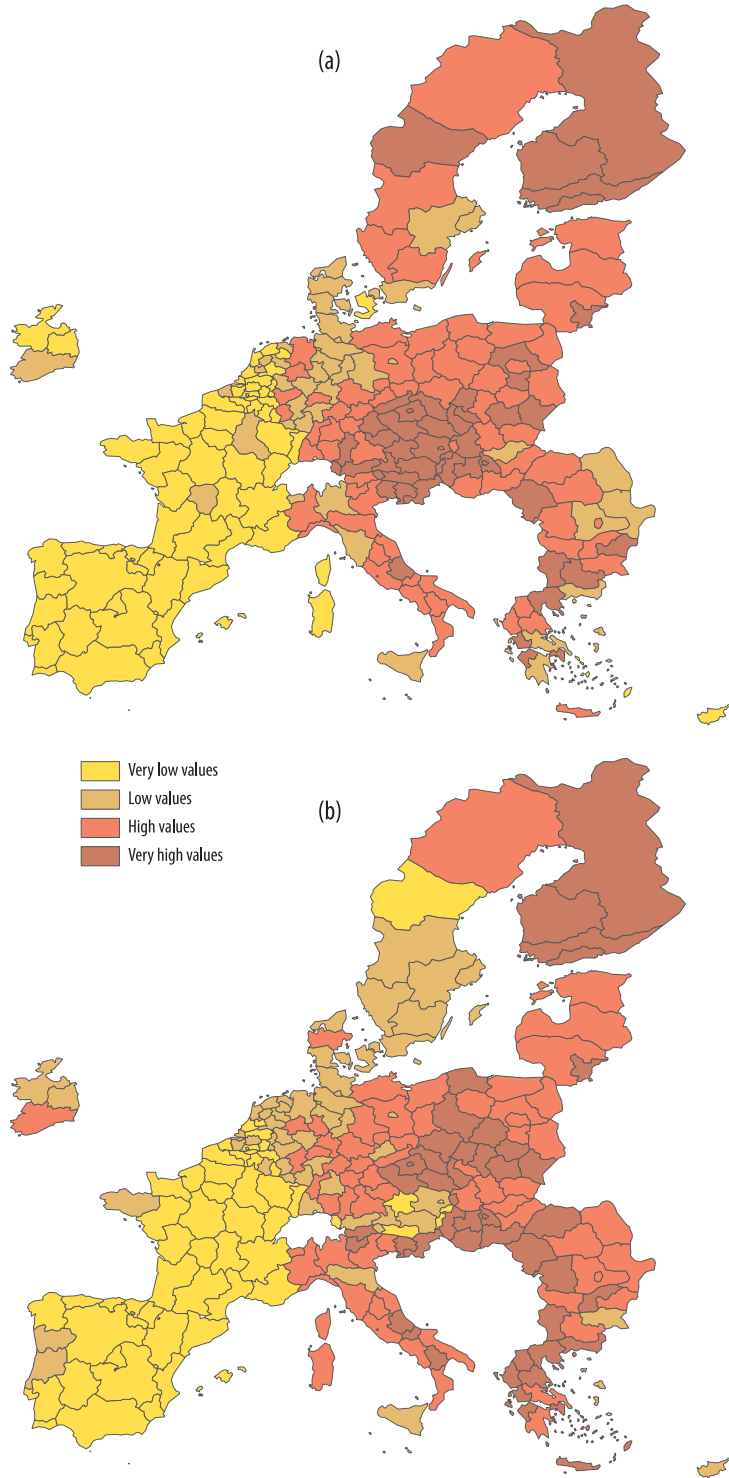


variable values in 2013 were more diversified between these regions. The relative deterioration of the situation concerns North Italian provinces and Scandinavian regions as well. In contrast, most of the Polish provinces found themselves in units with unemployment rate values below the median, which denotes the relative improvement in this part of the European Community.

Based on spatial distributions of the unemployment level in the EU regions, it can be presumed that values of the considered variable exhibit a certain tendency in space. Therefore, the spatial factor in the analysis should be included. In this connection, the spatio-temporal trend models in the following part of the study were concerned.

Seeing the spatial distributions of GDP per capita (Figure 2), we can note that the spatial differentiation of process values in both analysed years was analogous. Relatively high economic growth (with the values of GDP per capita above median) was observed in the Central EU regions (located in Austria,

Fig. 2. Spatial distribution of the GDP per capita (PPS) in EU regions in the years 2013 (a) and 2019 (b)



West Germany, North Italy, and Benelux countries). Also, a high GDP level was noted in the Scandinavian and South Ireland regions. On the other hand, the relatively less developed units were located above all in the eastern part of the European Community, except for regions Bratislava (SK01), Praha (CZ01), Warszawski stołeczny (PL91), Sostinès (LT01), and București-Ifov (RO32). Three mentioned units belonged to the group of regions with the highest values of the GDP per capita in 2019. A similar situation was observed in the Iberian Peninsula provinces. Almost all regions were classified into the groups of very low and low economic growth levels. Only two regions were characterized by economic growth above the median – one Spanish and one Portuguese (Madrid – ES30 and Área Metropolitana de Lisboa – PT17, respectively). As in the case of the unemployment rate, certain spatial tendencies in the formation of GDP per capita values were observed.

Figure 3 presents spatial distributions of educational attainment.

Fig. 3. Spatial distribution of the educational attainment level in EU regions in the years 2013 (a) and 2019 (b)

The percent of graduates in the upper secondary and post-secondary school (excluding tertiary education) is considered. It is worth seeing the possibility of the division of EU regions into two parts in both extreme years of the study (more visible in 2019). The first was in the eastern part of the European Community, where almost all regions were characterized by a relatively high percentage of graduates in upper secondary and post-secondary school. Instead, the western part of the mentioned area was dominated by units with the values of the considered process below the median. It is worth noting the lowest level of the variable  $X_2$  in the French and Spanish regions, where the unemployment rate was relatively high. Units with the low and high values of the educational attainment process created two almost coherent areas, which lead to presumption about a certain spatial tendency in their formation.

The observations made based on the spatial distributions of all processes allowed us to consider the two-dimensional deterministic trend (with the spatial and time factors) in order to filter out long-term tendencies. *Table 1* shows the results of estimation and verification of the spatio-temporal trend models for all variables. In the models, only the statistically significant parameters were left.

It is a difference in the degree of trend obtained for the variable  $Y$  and the two remain-

ing variables. The unemployment rate in the period 2013–2019 was shaped according to the second-degree spatio-temporal trend. Considering estimates of parameters  $\theta_{100}$  and  $\theta_{010}$  for variables  $X_1$  and  $X_2$ , we can conclude that their values averagely have been growing in the western-northern and eastern-northern directions, respectively. This confirms the insights visible in figures 2 and 3. Moreover, positive estimates of parameter  $\theta_{001}$  indicate the average increase of the GDP per capita and educational attainment in the years 2013–2019. In addition, an average decrease of the variable  $Y$  towards the north and east should be noted (negative estimations of parameters  $\theta_{010}$  and  $\theta_{100}$ , respectively).

The low level of the determination coefficient  $R^2$  is the characteristic feature of the spatial and spatio-temporal trend models. However, we can see that the least coherent values formation in space and time was pertaining to Gross Domestic Product per capita.

Additionally, the Moran test evaluating the dependence between neighbouring regions was conducted. In the spatial autocorrelation analysis, two types of neighbourhood matrices were used. First of them defines neighbouring regions as regions with a common land border (geographical neighbourhood –  $W$ ). Instead, the second points out that two units are neighbours if they had a similar level of the unemployment rate in 2019 (eco-

*Table 1. The results of estimation and verification of the spatio-temporal trend models*

Parameter	Unemployment ( $Y$ )		GDP per capita ( $X_1$ )		Educational attainment ( $X_2$ )	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
$\theta_{000}$	15.6290	0.0000	8.9967	0.0000	3.8209	0.0000
$\theta_{100}$	-0.0185	0.0000	-0.0190	0.0000	0.0120	0.0000
$\theta_{010}$	-0.5110	0.0000	0.0259	0.0000	0.0049	0.0000
$\theta_{001}$	–	–	0.0301	0.0000	0.0023	0.0927
$\theta_{200}$	0.0008	0.0000	–	–	–	–
$\theta_{020}$	0.0048	0.0000				
$\theta_{101}$	-0.0014	0.0123				
$\theta_{002}$	-0.0104	0.0000				
$R^2$	0.5432		0.3315		0.5318	
Moran test						
Matrix	$I$	p-value	$I$	p-value	$I$	p-value
$W$	0.4714	0.0000	0.3649	0.0000	0.4220	0.0000
$D$	0.4953	0.0000	0.0466	0.0019	0.1096	0.0000

conomic distance matrix –  $D$ ). The Moran’s  $I$  statistics for variable  $Y$  are very similar using both types of the connection matrix (0.4714 and 0.4953, respectively) with the proviso that units with a similar unemployment rate in 2019 showed slightly higher neighbourhood dependence. In contrast, the Moran’s  $I$  coefficient evaluated considering the distance matrix was relevantly lower than in the case of the first-order contiguity matrix  $W$ ) for two remaining variables. It means that the dependence of GDP per capita and educational attainment between neighbouring regions in a geographical space was stronger than between regions neighbouring in economic terms. Nonetheless, all determined Moran’s coefficients turned out statistically significant. This situation indicates the necessity of spatial dependence inclusion in the analysis of the relationship between the unemployment rate and economic growth, and educational attainment.

### Okun’s relationship models

In the first part of the relationship analysis, the TSCS (pooled time series and cross-sectional) model was considered. *Table 2* presents the results of the estimation and verification of the pooled spatio-temporal model. This is Okun’s model extended with the educational factor.

The negative estimate of statistically significant parameter  $\beta_1$  denotes that an increase in the GDP per capita causes an average decrease in the unemployment rate. This confirms the observations made by Arthur M. OKUN. The value of the elasticity parameter indicates that an increase in the GDP by 1 percent provides to decrease in the unemployment rate averagely by 0.41 percent *ceteris paribus*. A higher strength of the influence shows the educational level, where an increase of 1 percent causes the average decrease in the unemployment rate averagely by 0.73 percent.

Moran test results indicate the presence of global spatio-temporal autocorrelation in the model residuals. Therefore, the significance of dependence between neighbouring regions in the light of both neighbourhood matrices was concluded. So the spatio-temporal models estimated considering geographical and economic neighbourhoods should be analysed.

In order to determine the character of spatio-temporal dependence, the Lagrange Multiplier tests were conducted. Tests statistics in the basic version ( $LM_{err}$  and  $LM_{lag}$ ) do not solve the problem of the model choice – both are statistically significant. Analysing  $LM$  statistics in the robust versions of tests, we can conclude that the model with spatial factor in the error term for the  $W$  matrix is better. In turn, for the economic distance matrix (marked as  $D$ ), the model with a spatial lag of the dependent variable should be

*Table 2. The results of estimation and verification of the TSCS extended Okun’s model*

Parameter	Estimate	Standard error	t statistics	p-value
$\beta_1$	-0.4194	0.0320	-13.1190	0.0000
$\beta_2$	-0.7301	0.0925	-7.8960	0.0000
$R_2$	0.1353			
Moran test				
Matrix	W		D	
$I$	0.4363		0.4257	
p-value	0.0000		0.0000	
LM tests				
Statistics	Estimate	p-value	Estimate	p-value
$LM_{err}$	611.5708	0.0000	699.1660	0.0000
$LM_{lag}$	575.7326	0.0000	859.9580	0.0000
$RLM_{err}$	38.3835	0.0000	21.3310	0.0000
$RLM_{lag}$	2.5453	0.1106	182.1230	0.0000

chosen. Regardless of the results of the robust *LM* tests, both types of spatio-temporal models enriched with the spatial lags of explanatory variables were estimated.

Table 3 presents the results of estimation and verification of the spatio-temporal Durbin models (STDM) and spatio-temporal hybrid models (STHM), considering both connection matrices.

Similar to the TSCS model, estimates of statistically significant parameters  $\beta_1$  and  $\beta_2$  are negative, which confirms the positive influence of the GDP per capita and educational attainment increase on the labour market conditions in the EU regions. Nonetheless, the strength of impact is lower. The highest difference is observed in the estimate of the parameter  $\beta_2$  in the models for the *D* matrix – the 1 percent increase in educational attainment provides the average decrease in the unemployment rate around 0.4 percent (less than for the TSCS model around 0.3%). In all models, parameters  $\rho$  and  $\lambda$  are statistically significant, which confirms the necessity of including spatial factors in the analysis. Values of estimates of the spatial parameters within one connection matrix are very similar. Moreover, the estimates of both consid-

ered parameters are slightly lower in the case of models for the economic distance matrix. This indicates that regions neighbouring in the geographical space were more similar in the unemployment rate than the neighbours determined by the economic terms.

It is worth noting the statistical significance of the  $\theta_1$  parameter in all estimated models. Except for the spatial Durbin model for the *W* matrix (SDM\_W), the estimate of this parameter is negative. Considering the geographical neighborhood, changes in the unemployment rate in the neighboring regions had a different impact than changes in the random processes or processes omitted in the model. In turn, shocks like an increase in the unemployment rate level or in the random processes in the neighbouring (from the economic point of view) units caused a significant decrease in the unemployment rate in a certain region. However, shocks in the random processes or omitted explanatory variables were slightly stronger.

The desirable characteristic of the models with the *W* matrix is the lack of spatial autocorrelation in the models' residuals. In the light of the Akaike Criterion (AIC) and the logarithm of likelihood values (Log-lik)

Table 3. The results of estimation and verification of the spatial extended Okun's model

Parameter	Model			
	STDM_W	STHM_W	STDM_D	STHM_D
$\beta_1$	-0.3094 (0.0000)	-0.3289 (0.0000)	-0.3111 (0.0000)	-0.3296 (0.0000)
$\theta_1$	0.1461 (0.0014)	-0.1710 (0.0113)	-0.2275 (0.0001)	-0.3211 (0.0000)
$\beta_2$	-0.6009 (0.0000)	-0.6310 (0.0000)	-0.4030 (0.0000)	-0.4448 (0.0000)
$\theta_2$	0.2530 (0.0761)	-0.2921 (0.1194)	-0.0718 (0.6167)	-0.2769 (0.1483)
$\rho$	0.6204 (0.0000)	–	0.5642 (0.0000)	–
$\lambda$	–	0.6249 (0.0000)	–	0.5822 (0.0000)
Diagnostics				
Moran test	-0.0155 (0.2127)	-0.0170 (0.1895)	-0.0490 (0.0015)	-0.0347 (0.0182)
AIC	1,126.5000	1,118.9000	1,052.4000	1,095.5000
Log-lik	-557.2697	-553.4698	-520.1802	-541.7608

the best model is the spatial Durbin model estimated using connection matrix  $D$  based on the economic distance neighbourhood. Therefore, we can conclude about higher cognitive values of the models with the economic neighbourhood (regardless of the spatial autocorrelation presence in the model residuals).

Statistical significance of the parameters  $\rho$ ,  $\beta_1$  and  $\theta_1$  allows for quantifying the short-term spatial spillovers. Nevertheless, this issue is not the subject of the study. The quantification of the spatial effects is one of the directions of further analysis.

## Discussion

The analysis presented in this paper shows a large variation in the unemployment rate between EU regions, which is a significant economic problem. The problem particularly refers to the southern and eastern parts of the European Union. The causes of this situation have a different character. The economic growth and education level of society are considered as the most important indicators influencing the labour market level. Estimated models confirm that the increase in Gross Domestic Product per capita and educational attainment (measured by the percentage of graduates in upper secondary and post-secondary school) significantly causes the decrease in the unemployment rate. Moreover, the other individual characteristics of regions influence the labour market situation. One of them is specific economic structure, i.e., if the considered regions are rural or industrial. A verification of Okun's relationship for EU regions taking into account their specificity will be the subject of further research. BOĐA, M. and POVAŽANOVÁ, M. (2020) point out the necessity of diversifying regions by their specific characters estimating Okun's relationship. In turn, BONAVENTURA, L. *et al.* (2018) verified this relationship in two gender groups in Italy. They inferred differences in the sensitivity level of the unemployment rate on changes in GDP per capita between males and females depending on the geographic location of the region.

Some of the authors so far analysed Okun's relationship on the regional level. For example, DURAN, H.E. (2022) showed its significance for Turkish provinces. He did not include additional explanatory variables apart from the economic growth level, the increase of which causes the decrease in the unemployment rate in all provinces. In turn, MELGUIZO, C. (2017) considered the connection between economic growth and the unemployment rate in Spanish provinces. She inferred the same type of relationship (with different strengths) throughout the area. Also negative sign of Okun's coefficient for all regions of Slovenia obtained DAJCMAN, S. (2018). PALOMBI, S. *et al.* (2017) showed the same for Great Britain, analysing data for regions at a NUTS-3 level. Their study is one of few using spatial econometric models as a research tool for the verification of Okun's relationship. Other analyses based on the spatial econometric approach were conducted by MONTERO-KUSCEVIC, C.M. (2011), FERREIRA, R.M. (2013), and MAZA, A. (2022). In this research, additionally, the educational attainment level was included in Okun's model, which is not found in many other studies.

The methodological approach used in this research differs from other approaches. Firstly, previous researches including spatial connections between territorial units based on the First Differences Method of Okun's law. This analysis used the Fitted Trend and Elasticity Method enriched with the spatial trend. It is a new approach to establishing long-term dependencies in the formation of key indicators used in the investigation, which treats the trend wider than yet. In turn, the definition of one of the spatial connection matrices is new. It is an economic distance matrix built on the unemployment rate similarity between regions. As we saw in the results, changes in GDP per capita level in regions with similar unemployment rates influence stronger on the labour market conditions in the specific region, than changes in the regions directly adjacent. Spatial models in previous studies were estimated using neighbourhood matrices built based on the common land border or the geographic distance criteria. The weakness of this research is not consider-

ing the specific characteristics of regions, for example, a population composition, an economic structure, and other important indicators, such as an innovation level. These aspects will be the subject of further research.

## Conclusions

The regional approach to the verify of Okun's relationship has become more and more popular in macroeconomic analyses. Regardless of the regional disparities in the unemployment rate and the economic growth between NUTS-2 level units, the general dependence among these processes was confirmed in the European Union. The Okun's elasticity parameter ( $\beta_1$ ) in the estimated spatial models took a value similar to this, considered to be a benchmark around -0.3 (value received by Arthur M. Okun in his study). Moreover, the educational attainment turned out to be significant, and an increase in the percentage of graduates in upper secondary and post-secondary schools caused a decrease in the unemployment rate. In this connection, the first research hypothesis of the study was confirmed.

The economic similarity included in the models in the form of a neighbourhood matrix turned out to be statistically significant, so the similarity between regions related to the unemployment rate is relevant in Okun's relationship verification. So this is the second type of connection, next to the repeatedly confirmed significance of the geographical closeness (in this study, too), which allows for an understanding of the formation of the relationship between unemployment and output growth. A comparison of the estimated spatio-temporal models shows that models with the economic neighbourhood (regardless of the certain imperfections) better explain the mentioned dependence, which confirms the second research hypothesis. It means that the regions similar in the unemployment rate levels are connected stronger in case of the relationship between economic growth and labour market conditions than the regions directly adjacent to each other.

The proximity in the sense of the similarity of the unemployment rate can explain the imitation effect related to regularities and rules introduced by the governments of regions. The patterning of the regional rulers' behaviours from other provinces in the case of the labour market situation can provide similar changes in the labour market in a certain unit. It is also worth noting the policy of combating unemployment should be fitted to the regional specificity of the local labour market.

It is worth noting that in the adopted time range (2013–2019), all crises are omitted: (1) financial crisis in 2007–2009, (2) economic slowdown in 2012, and (3) COVID-19 pandemic from 2020 (due to lack of the data). In this connection, the relationship between the unemployment rate and output growth may be accepted as relatively stable in the European Union regions (which does not mean that not differentiated between units). In further research, this is worth concerning also the analysis of the regimes of the regions divided by the economic growth level and the impact of the COVID-19 pandemic on the mentioned relationship. This research will be enriched with the spatial effects quantified based on the estimated models and the use of other spatial connections matrices.

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## BOOK REVIEW SECTION

Solarz, M.W. (ed.): *Atlas of Poland's Political Geography. Poland in the Modern World: 2022 Perspective.* Drukarnia Legra, Warsaw, 2022. 392 p.

*"We have two duties to our friends: honesty and cordiality. Perhaps because these virtues are very difficult to practice."*  
(VINCENTZ, S. 1994 [1943], p. 77.)

Whether you are a reader with a layman's interest or a professional with knowledge of the subject, any map lover will be delighted to have a collection of maps of this quality to hand and leaf through.

My review is divided into two parts. The first is a closer look at the publication, approaching it from two angles: the ideological and theoretical concept of the atlas on the one hand, and its structure on the other hand. Thereafter, the second part of the review evaluates the publication from a specifically "Hungarian" point of view.

First, I have to note that, compared to the previous edition of the atlas (2018), the material covered has been significantly expanded and deepened. Meanwhile, the basic concept has not changed sub-

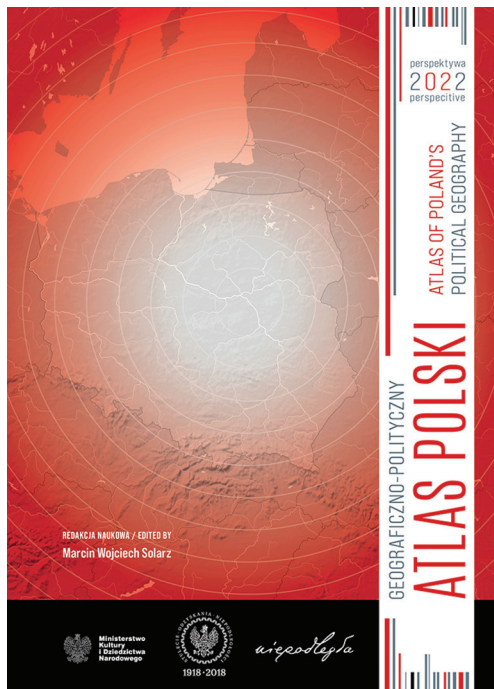
stantially. Hence, the book is much more than its title suggests. It is not simply an atlas of the political geography of a country, i.e., an impressive collection of thematic maps on subjects strictly within the scope of the discipline. Instead, it is a detailed and accurate portrait of the concept of Poland, in addition to its history, political and geographical existence, state institutions, power relations, physical geography, and socio-geographical foundations. It is a kind of self-portrait. The book, as the foreword illustrates, is seeking answers to the question of whether a "simply normal," in a specifically European sense "everyday" vision of a country is possible.

The geographical dimensions of the issues that fascinate and torment Polish society on this "historical stage" in this turbulent historical region of Europe are strongly linked to the question of borders. Virtually every aspect of the 'spatialization' of Poland, its geography, and all the social conflicts associated with it are reflected in the pages of the map collection. Moreover, presenting the conditions of existence for a state is also a great strength of the atlas. The attempt to explore the possibilities of constructing a "simply" Eastern European state may well be the most striking in this respect.

However, claiming that this work is simply a well-executed self-portrait would be misleading. More than that, it attempts to show what the "world" looks like from this particular Polish historical-geographical context. It is both a self-portrait and a window into the world, showing the way "Poland" sees – and seeks to see – itself and the world.

This alone justifies that the work could not be confined to a narrow discipline, i.e., political geography. Indeed, the thematic maps (and graphs) on display cover almost every aspect of human geography. Even economic geography is represented in its social aspects in numerous maps showing the spatial distribution of various indicators of economic performance, while the maps show the networks that ensure the supply of raw materials.

It has been an enormous undertaking to bring together this broad spectrum of approaches: to weave together the strands of different sub-disciplines, which differ in their methodological approaches and means of representation, into a coherent unit. This highlights – in addition to the meticulous work of the staff and professional communities who put together the atlas's individual sections – the work, ingenuity,



and perseverance of the editor who organized and conceptualized the whole project.

By its very nature, this edited collection of maps incorporates almost all the tools and methods of thematic cartography. It contains more than 900 (930, if I counted correctly) thematic maps and sketch maps, as well as, of course, general geographical maps and about 100 figures. The atlas contains an impressive quantity of information in excellent quality. Given its stated objective – providing a comprehensive, clear, primarily scientific, representative ‘tableau’ –, methodological issues are marginalized. Researchers more deeply involved in the issues presented may miss the methodological descriptions and, in some cases, perhaps a theoretical analysis. However, it is easy to see that their inclusion would have seriously stretched the limits of the work, which are financially constrained.

The structure of the work builds on the foundations of the previous edition five years earlier. However, the proportions have been slightly altered by including several new topics and more pronounced presentations. In this sense, the introductory chapter of the map collection (*Poland in Space and Time*, pp. 23–50) represents continuity for, in essence, it reflects the basic concept established in 2018.

The “backbone” of the entire atlas, both in terms of the number of pages and the number of maps published within a given section, is the second chapter, (*Borders, Territory and Memory*, pp. 51–162), which has been carefully elaborated and partially expanded. It includes over three hundred maps, more than a third of the total. Within the 13 conceptual chapters, the section on “historical identity and memory,” which seeks to capture the highly complex theme of “historical identity and memory,” takes place first with 70 high-quality and varied maps. The emphasis on this theme is perhaps one of the most commendable efforts of the whole work. Particularly well developed within this section are the detailed changes of Poland’s state borders in the 20<sup>th</sup> century. From a more narrowly interpreted “Hungarian perspective,” this section also deserves special attention, for example, for its careful analysis of the changes in the (Czecho)Slovakian–Polish state border. In addition to the presentation of border changes, the background of these changes is also revealed by ethnic geographic maps and historical outlines. From a purely political-geographical perspective, however, one of the most remarkable achievements within this chapter may be the sub-chapter (*Politico-geographical regionalization of contemporary Poland*, pp. 116–174), which, although it contains only four maps, is of great significance.

In terms of scope and number of maps, the second chapter is followed by two sections which, as already mentioned, are relatively outside the scope of political geography in the narrower sense. The third chapter (*Development*, pp. 165–232), presents

the country’s socio-economic development indicators broken down by region and mainly in comparison with the European Union. This chapter contains the largest sub-chapter (*The decade in review. Poland compared with the EU, EFTA, and UK*) with 116 thematic maps. All this fits in well with the concept, which, as it has already been mentioned, is not only presenting but also interpreting and, in all its complexity, exploring Poland’s self-understanding in the political geography and geopolitical context of contemporary Europe. A special section, the fifth chapter (*Geographical Names*, pp. 267–312), even exceeds the development chapter in terms of the number of maps (218). With its focus on identity, this section is undoubtedly somewhat “out of concept” but it is also certain that, from the point of view of this rapidly developing new field of research, it may be one of the most exciting parts of the whole work.

The fourth and sixth chapters (*The State and Politics*, pp. 231–266, and *Poles Abroad, Minorities in Poland*, pp. 313–318) are the parts of the book that address, by definition, the country’s political geography in the narrower sense, although the sixth chapter could certainly be classified under the umbrella term of ethnic geography too. A series of ‘classical’ electoral geography maps (*National Elections in 2015–2022*, pp. 252–265), which are well edited and represent a high standard, can also be enjoyed within this section, with 35 maps and eight graphics. Again, the maps depicting ethnic geography and exploring its spatial context are imaginative and of high quality.

Perhaps not entirely incompatible with the genre of review is expressing personal opinion. I cannot deny that the seventh chapter, which is in some ways an anomaly, is perhaps the one that left the deepest impression on me while I was scrutinizing the atlas. Poland and the “influence” of Poles on the world and in the world (and even in space: on the Moon and Mars) is a subject that stood out for its imaginative execution (*Polish Soft Power*, pp. 339–376). Moreover, this chapter is indeed full of innovative approaches, in both the elaboration of maps and the interpretation of “Polish influence.” The chapter is also characterized by a certain “pushiness” – in a good sense –, which is very appropriate. Personally, this is where I found my favourite maps in the atlas, which imaginatively and spectacularly show the goal-scoring output of the epoch-making football striker Robert Lewandowski between 2008 and 2022 (p. 358).

Although it may seem like a sort of inserted appendix, the final chapter of the atlas plays a vital role as it is seeking to illustrate the impact on Poland of the most significant external factors in the last five years, i.e., the COVID pandemic and the Ukrainian-Russian conflict, which escalated into an open war in 2023 (*Tempus Calamitatum*, pp. 377–389). If depicting a football star’s “work” is a heart-warmingly refreshing part of the map collection, unfortunately, depressive

maps dominate this chapter. Two maps stand out on pages 382–384 (NATO vs. Russia with Belarus), which I must admit I pondered at length. I wondered where I was familiar with the numbing impression of spasmodic fears that these maps of the military strength of the opposing camps conveyed, and it took me a while to realize that they were indeed – unwittingly – evoking the world of the similarly depressing propaganda posters of my youth in the 1970s.

Finally, a few words about the “Hungarian aspects” of the work and how they are perceived. First, a critical remark. Within the second chapter, which forms the backbone of the work, there is a sub-chapter consisting of 48 map sketches (*Central and Eastern Europe – Geopolitical changes from 966–2022*). Two problems can be raised about the attractive maps in the series, this time from a strictly selfish, “Hungarian” perspective. The first is the cropping and spatial framing of the map sketches: unfortunately, these maps only show the tiny eastern part of present Hungary’s territory, so no major settlement in present-day Hungary “fits” on them and is therefore named. Obviously, the map series’ authors and the atlas’ editors must have had severe problems in solving the framing of the cut-outs of the map series, and several objective printing or page-editing difficulties may have played a role in this. Nevertheless, from “our” point of view, it is quite painful that in the end, Buda (or Esztergom and Visegrád) as the political centre of a country neighbouring Poland, was unfortunately left out of the map. It is true, we might add, that Kiev, for example, has also fallen victim to this choice of frame. It is, however, interesting to note that although the name of “Pozsony” is shown on the map series from the initial sketch (depicting the situation in 966) to the last one (2022), it is written as ‘Bratysława,’ which is somewhat anachronistic before 1918, at least in the light of contemporary Hungarian historical interpretation and historical-geographical naming practices. This is, however, undoubtedly only a nomenclature-related dilemma that could be solved in several ways.

The “bigger problem” or oddity is that in this series, the maps for 1003 and 1025 (as opposed to the maps of 966 and 962) show the whole territory of present-day Slovakia and even a little more than that: the border at Tokaj extending to the Tisza River, with Poland delimited by sharp contours. I do not dispute that there has long been a “Polish reading” of specific historical facts and documentary references that could be used as a basis for such an interpretation. I am not aware, however, of any recent radical change in the Hungarian historians’ perception of this issue in comparison with the position of György Györffy (1983), who was still formulating a refutation of these constructions in the 1980s.

During almost the entire reign of Hungary’s founding monarch, King St. Stephen, would the

Danube bank opposite to Hungary’s then “capital city” Esztergom have been part of the Kingdom of Poland? Including the whole of the “Little Danube Plain on the left,” and the whole of today’s Slovakia and Northern Hungary, including Tokaj? Well, I will have to get used to digesting this – for me – “new history,” that is for sure. Let me say, albeit in a rather unscientific way, that I do not really believe in it. Alternatively, perhaps more accurately: I am not really convinced of the historical validity of this reading. (I might add that the position of the Czech-Hungarian border on several maps in the atlas, up until 1241, differs radically from the way they are depicted in today’s historical-geographical atlases of Hungary.) On the Hungarian side, we must get used to the fact that this interpretation of history is rather consistent from the Polish perspective since we can already find this conception of the state territory in earlier parts of the atlas on page 46.

Looking through the collection of maps with “Hungarian eyes” – if that is how it can be interpreted – we can find many factors rooted in our “common” historical past, with political geographical influences and consequences: historical events and processes, and the presence of history-shaping personalities. However, these do not seem particularly significant or important when viewed through the whole work, i.e., through the “Polish window on the world” (as interpretative framework). Building on the pillars of a narrative of a ‘common history’ that might be considered more or less common, it is easy to find such clues, but the overall impression may not meet the preliminary “expectations.” Yet, this cannot be a coincidence. The atlas does not interpret and “map” Poland and the Polish society and nation within the – so to speak – familiar Central European framework but based on a global scale. It seeks to present a mirror of the world “seen” from Poland. On this scale, things are then “put in their proper place,” according to their weight and importance, for example, the ideal of the Polish-Hungarian historical community of destiny, which has been carefully preserved for generations.

Poland’s long and perhaps “forever unfinished” struggle for existence: from that perspective, the Hungarian threads, while they may be vital in themselves and, in their own right, significant and decisive in their own time, are mere “side threads.” But history is a mass of such side threads woven into a flowing series of events. The Vistula, the great river that flows into the Baltic Sea near Gdańsk (ancient Hungarian name ‘Dancka’) in the far north, is considered by many to be the main artery of Polish history and geography, and for good reason. The tributaries flowing into the Vistula from the southern side of the Carpathian watershed add at least as much to its waters as the Hungarian bonds have influenced Polish history and geography. That is by no means few or insignificant, and especially not “negligible!”

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Gyuris, F., Michel, B. and Paulus, K. (eds.): **Recalibrating the Quantitative Revolution in Geography: Travels, Networks, Translations**. Abingdon–New York, Routledge, 2022. 232 p.

The questions of how, where, and by whom geographical knowledge is produced caught the attention of many scholars in recent decades. These issues are of interest to the researchers of the history of geographical knowledge and the geography of scientific knowledge (LIVINGSTONE, D.N. 2003), while it is also important how scientific methods, concepts, and ideas move from one particular place to another (JÖNS, H. *et al.* 2017). The volume I revise in the following pages is a recent contribution to these efforts. The aim of the editors was to approach the history of quantitative human geography from a critical point of view, that is, to challenge the Anglophone narratives and the Western hegemony (TIMÁR, J. 2004; PAASI, A. 2015) in this sense.

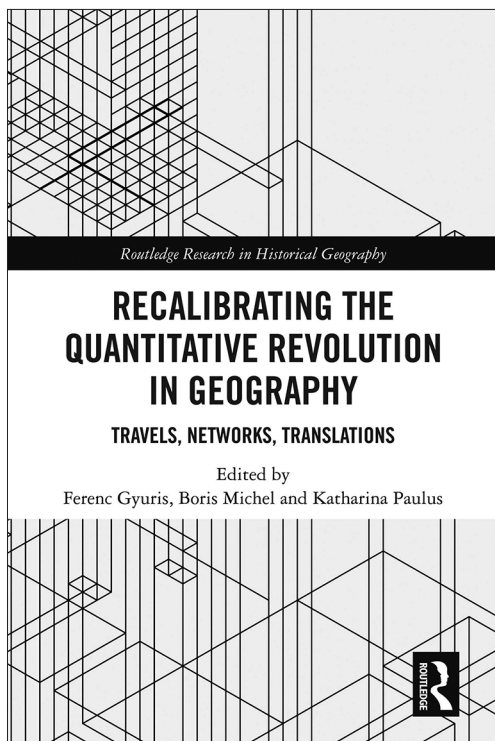
*Recalibrating the Quantitative Revolution in Geography: Travels, Networks Translations* is an outcome of scholarly discussions which were taken place between 2017 and 2020, primarily in the frameworks of international conferences and workshops. Key events leading to the birth of the volume were “Neue Kulturgeographie –

New Cultural Geography” conferences between 2017 and 2020, the session “Histories of the Quantitative Revolution from a Different Perspective: Practical Implementation in Service of Political Agendas” at the 2018 Annual Meeting of the American Association of Geographers and a workshop on the histories of quantitative revolutions in geography in 2019.

The introductory chapter presents the goals of the volume and its underlying approach by applying a metaphor represented by a piece of art by Gertrud “Gego” Goldschmidt, namely the *Reticulárea*. This artwork from 1969 shows a combination of “metal rods” which “form a web of complex networks and meshes. While there is a remarkable regularity in triangles of different sizes, there is also chaos and distortion. It is not clear whether all the elements form one interconnected structure or whether different structures coexist within this space. The web has neither a centre nor any clear boundary, and it appears to be a structure composed of the surface without any content” (p. 1). While the *Reticulárea* fits to the positivistic paradigm of the 1960s focusing on universal models and abstraction of individual phenomena, it is also a starting point for the critical deconstruction of the traditional history of ‘the quantitative revolution’. One should think of the history of quantitative geographies as “a history of many connections of small and large networks of traveling ideas and people and the constant transformation and translation of these ideas and concepts” (p. 2) in the editors’ point of view.

In order to “recalibrate” the Anglophone (and more specifically US-centred) narrative on the rise of quantitative human geography and spatial science, most of the chapters of the volume (1) bring together papers on the histories of non-American national traditions (Chapters 2 to 4, and 6 to 11), while (2) taking into account the roles of both formal and informal academic networks forming local geographical schools (Chapters 2 to 13), and (3) analysing the international and national political, social and economic contexts which shaped the application of quantitative methods (Chapters 2 to 11). As can be seen, most of the volume discusses similar topics and takes a coherent approach to present selected national cases. However, Chapters 5, 12, and 13 are rather different compared to the rest of the book in several aspects. Therefore, I first focus on Chapters 2 to 4, and 6 to 11 and show at the end of my revision in which respect can the remaining three chapters be considered different.

Michiel VAN MEETEREN (Chapter 2) provides a history of spatial science in the Netherlands. Following the formation of scholarly networks and institutions in line with the social and political contexts from the 1920s up until the late 1960s, he shows that quanti-



tative traditions were present in the Dutch context decades before the ‘quantitative revolution’ in the US. However, these achievements are mainly missing from the mainstream historiography of Dutch human geography as these quantitative researches took place primarily within governmental institutions, and many of them were never published. The chapter vividly illustrates how Dutch geographers influenced by the student uprisings in the late 1960s “were so immersed in the American hegemonic presentation that they overlooked curating their own tradition” (p. 14).

Chapter 3 presents the *Geographies of quantitative geographies in Brazil*: Mariana LAMEGO takes “a place-based narrative trying to cover a broad materialised network of bodies and artefacts responsible for the quantitative revolution diffusion in Brazil” (p. 31). Deriving from the local institutional histories of the cities of Rio Claro and Rio de Janeiro embedded in international scholarly networks, LAMEGO shows how quantitative geographies were applied at these places: spatial diffusion of quantitative methods and theories was possible through personal connections established long before the quantitative revolution, serving as channels for the mobility of the human (people and their knowledge) and non-human (books, computers) means of academic work.

Chapter 4 also places Brazilian quantitative geography in an international context: the role of translations of academic papers initially written in English and French languages can be considered central in Brazilian “academic modernization” (p. 46) due to the country’s peripheral position. Revising the articles published in two major geography journals, the *Boletim Geográfico* (1966–1976) and *Revista Brasileira de Geografia* (1970–1982), Guilherme RIBEIRO points out that one should think of translations published in the Global South as a political issue; “what who and which themes” (p. 56) are circulated has a key role in the formation of national traditions in peripheral countries. The findings of the chapter are mind-provoking. However, due to the anonymity of the translators for the large majority of the articles, it was not possible for the author to provide thorough, structured knowledge of the background of the translators themselves (for example, personal networks and motivations), which could offer insight into the selection process of the translated articles.

Chapter 6 provides an account of the changing role of quantitative methods in Hungarian human geography from the early 20<sup>th</sup> century until the 2000s, and the evolution of the institutional framework. Ferenc GYURIS shows how quantitative methods were applied in different eras for mainly political goals: statistics were mobilized in the interwar period to serve the territorial revision of the Treaty of Trianon. After WWII, quantification was led by changing geopolitical power relations. During the state socialist period, ‘neutral’ and ‘objective’ mathematical models were

imported from Soviet and Western authors serving territorial development and planning, while after the transition of the 1990s, applied quantitative geography gained importance due to the availability of EU regional policy funds. GYURIS presents how the changing geopolitical influences were related to the application of foreign scholarly literature throughout the period analysed.

The contribution of Olivier ORAIN (Chapter 7) presents the emergence of a new quantitative and theoretical paradigm in French human geography. By analysing the broader social and political changes, it shows how and why Marxist and critical quantitative geography emerged in the late 1960s and how it developed until the 1990s. Considering the formal institutional framework of the university and academic system, it also reveals that the new approach started as a movement and gained ground after a generational shift in the era of academic expansion amidst a growing number of academic jobs.

Katharina PAULUS and Boris MICHEL analyse in Chapter 8 how quantification, modelling and remote sensing technologies affected geography’s relation to nature in Germany and how this process related to the sub-disciplinary divide of human and physical geographies. Chapter 9 by Boris MICHEL focuses on the mechanisms which resulted in the city becoming one of the main objects of geographical research. The case of German human geography reveals that the rise of industrial capitalism and the city as an essential product coincided with the application of quantitative methods from the 1920s onwards. Both Chapter 8 and Chapter 9 are thought-provoking as they take the objects of scientific inquiry to a central place and explain the discipline’s shifting views on those objects through transformations occurring in the social and economic systems in which scientific knowledge has been produced.

In the following chapter, Larissa ALVES DE LIRA takes a *longue durée* approach to follow the early stage of quantification in Brazilian geography. Based on the papers published in the *Revista Brasileira de Geografia* between 1938 and 1960, the author scrutinizes the quantitative works of geographers at governmental agencies. Publications containing statistics in the form of tables, images, and maps are considered. In the period analysed, the Brazilian state was a leading actor in gathering and processing statistical data driven by the goal of modernizing the country. ALVES DE LIRA also reveals that the work of Brazilian geographers was mainly influenced by French, German, and Anglophone schools of thought.

Matteo PROTO’s Chapter 11 discusses the long-term evolution of Italian quantitative geography from the late 19<sup>th</sup> century onwards. In his contribution, the author provides an overview of the intellectual heritage Italian geographers’ work was built upon, the development of the academic institutional framework, and

the political-social context, which made quantitative geography an important pillar of applied research during and after the interwar period. As the author puts it, “since the beginning of the 1950s certain innovative theoretical and methodological approaches arose in Italian geography that were not too dissimilar from the coeval dominant paradigm, mainly connected to applied economic geography and aimed at empowering the quantitative and modelling approach that had emerged previously with the rise of positivism at the end of the 19<sup>th</sup> century” (p. 174). However, “what took place throughout the 1970s was a progressive critique of the role geographical knowledge played in sustaining and neutralizing political discourse” (p. 176).

While the chapters analysed above focus on national traditions of quantitative geographies and their transformations, Chapters 5, 12, and 13 are dealing with specific projects and biographies of US geographers; it is not only the scale of analysis that is different in these chapters but also the geographical focus. What seems to make these chapters fit into the volume is that they contribute to deconstructing the traditional narrative on ‘the quantitative revolution’. Chapter 5 concentrates on the origin and development of digital mapping in the US. The approach Matthew W. WILSON takes in this chapter considers the personal biography of Howard FISHER and the role of the institutional context in order to “disrupt the easy origin stories with the cul-de-sacs of experimentation and failure, tenuous allies and adversaries, and the fragility of thought and action” (p. 66). The central subject of the chapter is the SYMAP project, which was an innovative achievement in digital mapping in the 1960s, organized by FISHER and Betty BENSON. Chapter 12 is dedicated to William BUNGE and his book titled *Theoretical Geography*. The authors, Trevor BARNES and Luke R. BERGMANN, scrutinize BUNGE’s personal and academic background to explain the main features of his manuscript and the novelties it brought about. Matthew HANNAH’s Chapter 13 presents the projects of Peter GOULD in the 1980s and Alain BADIOU in the 2000s, which aimed to elaborate on the ways quantitative social science could be critical for the sake of “rescuing mathematical thinking from the negative connotations it has acquired in the critical cultural and social thought of recent decades” (p. 195). While Chapters 5 and 12 deal with the processes forming quantitative geography and spatial analysis in the 1960s and aim to shed light on less-known mechanisms and personal stories affecting the developments of the approach, Chapter 13 discusses the efforts to revisit the role and future potential of quantitative social research.

In the final chapter, the authors discuss some concluding questions about their thoughts on quantification in geography with respect to past, present and future processes. Chapters of the volume have

shown that the US-centred narrative on ‘the quantitative revolution’ has serious shortcomings: national traditions of quantitative geography are diverse and, in many cases, preceded the positivistic-quantitative turn of the 1950s. On the other hand, it is also apparent that there are many similarities in the histories of different national cases. Even the early endeavours in quantitative geographies were led by the states, and research took the form of applied science to underpin development plans and to gather knowledge in a way useful for political power. One can also learn from the volume that different national schools of thought impacted each other due to the personal and formal institutional networks.

GYÖRGY MIKLE<sup>1</sup>

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## CHRONICLE

### In memoriam Ferenc Schweitzer (1939–2023)

A prominent figure of Hungarian geomorphology and Quaternary research passed away on March 6, 2023. As he liked to mention, his ancestors came from Alsace to design water management works in the northern part of the Little Hungarian Plain and settled there for good. When this area was finally annexed by Czechoslovakia as a consequence of the Slovak-Hungarian ‘population exchange’ agreement after World War II, the family had to move to the present Hungary. He studied geography and biology at the Teacher Training College of Szeged and then at the Eötvös Loránd University of Budapest. During his university years an event with deep impact on his future career was his finding of the first pebble tools at Vértesszőlős in 1962 and his participation in the excavations led by Professor László VÉRTES, which peaked in the discovery of the hominid finds. This event had a decisive impact on his early scientific interests. Consequently, he ventured on research into freshwater limestones (travertines) related to river terraces in cooperation with the geologist Gyula SCHEUER.

On joining the staff of the Geographical Research Institute, Hungarian Academy of Sciences, in the 1960s, his experience gathered during the study of landforms both in the library and their recognition in the field as well as his keen observations of human character made him rise in career. By the 1970s he was set as an example of the talented and hard-working field geomorphologist with a profound knowledge of professional literature to young researchers in the Institute. Major steps in his career were the Doctor of Sciences title in 1993 and his nomination to deputy director of the Institute. Then he undertook the (far from being uncomplicated) job of director of the Institute between 1997 and 2010. In this capacity he fought ardently and, finally, successfully for the survival of the almost wrecked ‘flagship’ of Hungarian geography.

In this period his sphere of research broadened to embrace an exceptionally wide range of fields from Quaternary geochronology, neo-tectonics and Late Cenozoic climate change to the origin of floods and excess water inundations and their control. He liked to ‘think big’ and set up theories not only on the history of the Danube catchment but also on the Tertiary drainage evolution of the entire Eurasian continent. He found ample evidence for and enthusiastically spread his concept on an arid, desert-like period in the Carpathian Basin. In 1998 he even edited a collection of papers (with Tibor TINER) on the geographical requirements of site allocations of large industrial investments and



hazardous waste disposal, which – along with his investigations concerning engineering geomorphological problems and the seismic hazard of the Paks Nuclear Power Plant – reflected his ever present interest in the solution of practical applications of research findings. In addition to popular lectures, the book “Land, Water and Air” edited with academician Ernő MÉSZÁROS, published as the first volume of the Academy series Magyar Tudománytár (Hungarian Scientific Archive) in 2002, was his main contribution to the dissemination of science. He was a great fan of new results and challenges in science, such as the possible presence of water and life on Mars, which he investigated through the landforms and processes of the planet.

He was invited to lecture at the University of Pécs in 1992, where he received habilitation (1995), became professor (1996) and professor emeritus (2004). At Pécs he always felt very comfortable and esteemed in the circle of fellow teachers and students. At the University his foremost ambition was to establish the institutional background to university-level teaching,

including the revival of geomorphology in the curriculum, to discover talented students and to encourage them to engage in research. At that time geography students were more keen to respond to his call and followed him to the field – where he really felt at home and where he could inventively and almost instinctively reconstruct past geomorphic processes. He never refrained from sharing his ideas with the best students selflessly and always treated those who were worth of such a treatment as partners. He never ceased to emphasize that a good teacher simply cannot hide novel ideas and scientific thoughts in his lectures. His enthusiastic lectures presenting new approaches to geomorphological issues of Hungary and the Carpathian Basin aroused interest among the audience and he managed to recruit dozens of young geographers for the staff of the University of Pécs, the Geographical Institute in Budapest and other academic institutions. With his enduring work in the Earth Sciences Doctoral School he established a geomorphological school which involved a generation of researchers and teachers.

In acknowledgement of his scientific achievements, he was awarded by the Silver Medal of the Work Order of Merit in 1987, but true appreciation came with the change of the political system. Then he became ordinary member of the St. Stephen Academy of Sciences (2004), honorary member of the Hungarian Geographical Society (2001) and of the Hungarian Society for Karst and Cave Exploration (2001). The Geographical Society awarded him with the Louis de Lóczy Medal (1995) and the University of Pécs with the Gyula Prinz Medal (2004).

His infinite curiosity was not only reflected in his scientific research, but also in his ardent wish to travel in the world, to discover remote and exotic lands known to him from his readings – in the true spirit of the geographical explorers of the past whom he greatly admired. This quest took him to the Loess Plateau of China, where he spent a month practicing one of his main interests in Quaternary science and geomorphology, the origin of loess. In addition, he took all possible opportunities to get acquainted with the cultural monuments of the region. Also he used a chance to visit Alaska, where he was confronted with several riddles of periglacial geomorphology in the company of world-leading experts, who immediately became his friends in the course of the field trip. One of the highlights of his travels was a round-the-world journey with the University of the South Pacific in Suva, Fiji Islands, as destination. With his colleagues he marvelled at the new landscapes and strange customs we met on the Pacific Islands which he called paradise on Earth. India was another country of his dreams, where again it was difficult to decide whether the unpaired edifices, like the Taj Mahal, or the spectacular landforms, like the traces of huge landslides, exerted a deeper impact on the visitor.

Although always friendly with everybody at personal encounter, his character was not easy to read. Life experience taught him for cautiousness, not to reveal his real opinions publicly. Indeed, he was eager to share his knowledge with students and researchers of the younger generations. Through this behaviour he certainly set an example of the attitude of a professor for all of us. He will be remembered as the embodiment of the field geomorphologist and a peculiar, respectable and amiable personality in the history of the discipline.

SZABOLCS ÁKOS FÁBIÁN, GÁBOR VARGA and  
DÉNES LÓCZY

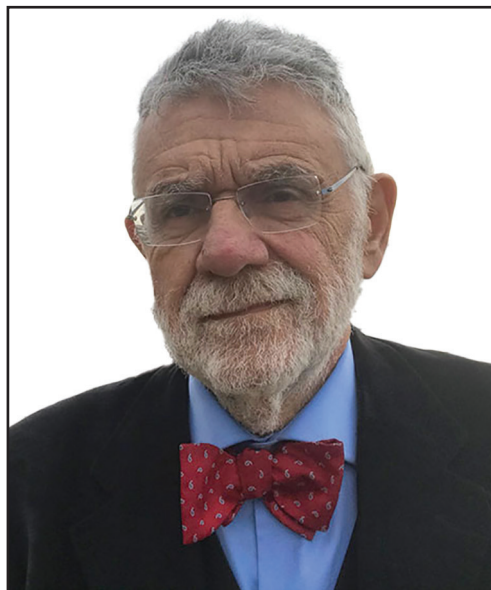
### In memoriam Armando Montanari (1946–2023)

Armando MONTANARI, true to the substance of his profession, geography, was an integrative person. He had great merits in the internationalization of Italian geography, pulling down the wall that once separated Eastern and Western European science, in supporting Hungarian human geographers. His bow tie, a constant element of his attire, was in itself an expression of elegance, of the generosity and broadly interpreted Europeanism that was a defining part of his personality. Since he lived and worked in Vienna and Brussels for certain periods, he could communicate fluently in English, French and German, but he had an excellent understanding not only of the languages but also of the spirits.

His life was as colourful as his personality. In addition to his academic career, he also worked as a consultant. He often appeared in the position of a researcher, professor, manager, science ambassador and project leader all at the same time. He performed all his jobs as if he was born to do them. He started his career in 1973 in the administration of the Latium Region, later he worked at the Ministry of Planning and Public Works, the Ministry of Education as a consultant in the field of urban and regional planning, tourism, and science dissemination. Professor MONTANARI committed himself to higher education in 1975, when he became lecturer on Economics of Urban Conservation at ICCROM (International Centre for Conservation, Rome). Between 1998 and 2007 he worked as professor of Economic Geography of Tourism, Urban Economics, Tourism and Local Development, Tourism and Global Changes at University G. d'Annunzio, Pescara. In 2007 he became professor at Sapienza Rome University, Department of European American and Intercultural Studies. In 2015 he became the president of the university programme on Tourism Sciences.

Professor MONTANARI actively contributed to the work of several international organizations: 1978–1983 he was scientific secretary at the International Council for Social Sciences, European Coordination Centre for Research and Documentation in Social Sciences, Vienna; 1993–1998 he was member of the Board of Directors and President at European Environmental Council, Brussels. Armando MONTANARI supported intensively the cross-border collaboration of European geographers, he was Secretary General (1998–2002) and Vice President (2002–2012) of the Association of European Geographical Societies (EUGEO).

Tourism and migration studies were in the focus of his academic interest, in both fields he achieved recognition. He had a particular interest in gastronomy and research into local products serving for regional development. Although he spent most of his time in



Rome, his heart rooted not only in the Italian capital, but also in the Abruzzo region, especially Pescara. He coordinated a large number of international projects, and his list of publications is also impressive, nevertheless, his main merit can be linked to international academic relations. He founded the Commission of the International Geographical Union (IGU) on Global Change and Human Mobility (Globility) in 2000, which he chaired from 2000 to 2012. He involved and integrated 150 researchers from nearly 50 countries in the Globility's "family", organising and implementing a series of international scientific conferences and related field trips all over the world.

He made lifelong friendship with Hungarian human geographers before the change of regime, among them academician György ENYEDI (1930–2012) and his research team while he was staying in Vienna (Austria). He maintained intensive work connection with the department of the late professor István SÜLI-ZAKAR (1945–2017) from the University of Debrecen. Thanks to this cooperation, Hungarian PhD students and young researchers were provided an opportunity to integrate into the international community of geographers. This issue of the Hungarian Geographical Bulletin is dedicated to Armando MONTANARI. His memory will be preserved forever.



# GUIDELINES FOR AUTHORS

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