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# Exploring resilience of the hotel industry using the example of Polish regions. The case of COVID-19 pandemic

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***Abstract***

***PURPOSE:*** *This study explores the relationship between the resilience of the hotel industry (an underdeveloped concept) and the factors that support the development of this industry. It examines whether the resilience of the hotel industry varies regionally and whether it is influenced either by the characteristics of the hotel industry or by regional economic conditions. The study focuses on the COVID-19 pandemic, which particularly hit the hotel industry.* ***METHODOLOGY:*** *The clustering method is used to identify regions in Poland with similar pre-pandemic hotel industry development are identified. Secondly, Potthoff's analysis and Kruskal-Wallis tests with Dunn's tests are used respectively to identify variations in the resilience responses of the industry in different regions and to examine the antecedents of these variations.* ***FINDINGS:*** *The data collected indicate variations between clusters in terms of resilience response. Not all factors that support the development of the hotel industry in a particular region are equally conducive to its resilience. Our study shows that the pandemic was not an isolated or unique event but rather a catalyst that brought long-standing issues for the hotel and tourism sector.* ***IMPLICATIONS FOR THEORY AND PRACTICE:*** *This study contributes to the development of resilience theory by providing evidence-based arguments for separating the domains of resilience and development and for a more granular exploration of the trade-offs between them. From the perspective of the hotel industry, insights into narrowly channeled agglomeration externalities during a crisis could inform strategic decisions regarding the location of hotel investments, the value proposition created, and business model diversification. Therefore, there is a need for more resilient crisis management strategies that can be applied across the tourism sector. These strategies should encompass effective supply chain management and a robust framework for labor security.* ***ORIGINALITY AND VALUE:*** *The findings suggest that hotel industry development factors, which include both industry characteristics and regionally shaped economic conditions, provide mixed support for the resilience of this industry. The study revealed clear tensions between development and resilience impacts by highlighting existing trade-offs. Focusing attention on trade-off tensions advances both the conceptual validity and application potential. Although the present study was defined for the specific circumstances of the hotel industry, this approach can be replicated in different industries that are components of the supply chain of the tourism market and its value chain.*

***Keywords:*** *hotel industry, resilience, multidimensionality, pandemic, regional conditions, COVID-19.*

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## INTRODUCTION

The hotel industry represents a key link in the tourism value chain, as it is fundamental to the provision of further services in a tourism destination (Mitchell et al., 2015) and, accordingly, contributes to the economic social and cultural development of the community (Nikolskaya et al., 2018). However, the COVID-19 crisis has ignited and fuelled major disruptions across tourism-related businesses (Farmaki et al., 2020). The severity of the restrictions imposed has raised questions concerning the resilience of the hotel industry, particularly given its indispensable role in the development of further services in a tourism destination (Brown et al., 2017). Understanding the resilience of the hotel industry is paramount as it directly impacts the stability of local economies, community livelihoods, and the overall competitiveness of tourist destinations, requiring effective crisis management strategies and policy interventions.

While resilience in the tourism sector has been studied in relation to various crises such as climate change (Cellini & Cuccia, 2019), natural disasters (Biggs et al., 2012), economic downturns (Perles-Ribes et al., 2016), terrorist attacks (Chen, 2011), and epidemics (Chen et al., 2007), there remains an uneven distribution of studies, with industry analyses being relatively underrepresented (Brown et al., 2021; Di Tommaso et al., 2023; Kurth et al., 2019). Despite the growing interest in resilience research at different levels—destination (Filimonau et al., 2020; Matteucci et al., 2022), organizational (Ntounis et al., 2022), and intra-organizational (Giousmpasoglou et al., 2021)—limited attention has been paid to examining resilience from a hotel industry perspective (Filimonau et al., 2020; Giousmpasoglou et al., 2021; Ozdemir et al., 2021). Furthermore, existing studies often focus on selected specific factors such as employment rates, visitor arrivals, and revenues, rather than taking a comprehensive view that considers both industry-specific characteristics and regionally shaped conditions (Bangwayo-Skeete & Skeete, 2021; Khan et al., 2021; Peco-Torres et al., 2021). While the importance of resilience for the industry's long-term viability is widely acknowledged, the precise nature of the relationship between resilience and development remains ambiguous, oscillating between overlap, synergy, and trade-off (Hillmann & Guenther, 2021; Holm & Østergaard, 2015).

This study aims to address these gaps by investigating the relationship between the resilience of the hotel industry and the factors that support its development by providing answers to the main research question (RQ):

RQ: Are the factors supporting the development of the hotel industry in a particular region conducive to its resilience?

The research examines both industry-specific characteristics and regionally specific factors, leveraging the Covid-19 pandemic as a lens to explore the intersection of resilience and development in the hotel industry. Resilience is emerging as a critical competency for hotels, with studies indicating that resilient hotels are better equipped to navigate challenges. Resilience not only contributes to financial performance but also fosters sustainable organizational success and enhances competitive advantage (Cavaco, 2015). Resilient enterprises, particularly those with innovative characteristics, tend to sustain higher levels of performance compared to their counterparts (De Carvalho et al., 2016). Orchiston et al. (2016) further highlight the importance of problem solving, strategic planning, and building external networks in cultivating resilience, which in turn positively impacts both individual entities and entire industries. The impact of resilience on business performance is particularly pronounced in small businesses (Prayag et al. 2017) which are dominant in the hotel industry.

Despite general discussions on the industry's resilience during global shocks, regional variations exist due to differences in pre-crisis economic situations and hotel structures. This study examines the differential impact of crises across regions, taking into account location-specific amenities, economic structures, and externalities. Through regional clustering and analysis of resilience responses, it seeks to identify the factors driving resilience variations.

Our research focuses on the hotel industry in Poland, which is characterized by significant natural and regional economic heterogeneity, mirroring of other regions in Central and Eastern Europe (CEE). Our findings suggest that highly developed hotel industries may not necessarily exhibit high resilience, highlighting the need to differentiate between factors supporting industry development and resilience. This research highlights significant limitations in extrapolating the impact of industry development factors in a region and emphasizes the importance of parallel analysis to foster regional resilience. As such, this study contributes to the broader discourse on resilience within the tourism sector, and informs future policy and industry practice.

## LITERATURE REVIEW

### Industrial resilience

Conceptually, resilience has been defined as the resistance and adaptation of the structure and function of a particular system in the face of disruption while maintaining its identity (Biggs et al., 2012). Thus, developed proposals frame organizational resilience as a capability, process, outcome, or characteristic (Hillmann & Guenther, 2021). In this study, we draw on the capability-based approach (Duchek, 2020; Najda-Janoszka, 2016) and argue that organizational resilience is not an organizational process per se but is embedded in processes that are observed when it is activated (Duchek, 2020). Activation refers to accessing and mobilizing appropriate resources along developed routines to perform and coordinate organizational survival in the face of unexpected adversity, such as events with potentially high consequences for organizational functioning and survival (Lengnick-Hall et al., 2011). As such, the patterns of actions taken may vary across organizations (Kantur & İşeri-Say, 2012) and thus leading to different degrees of resilient responses, such as maintaining functions and access to resources, and mobilizing timely actions (Hillmann & Guenther, 2021).

While previous research has predominantly examined differences in resilience at the organizational and individual levels (Hillmann & Guenther, 2021), a growing body of literature focuses on understanding resilience at the industry level. These studies recognize the significant economic impact of industries, and their varying levels of exposure and vulnerability to risk (Brown et al., 2021; Di Tommaso et al., 2023; Holm & Østergaard, 2015). It is essential to study the resilience of industries, as the failure of industries to withstand shocks could jeopardize the sustainability of systems at different levels, including that of individual enterprises (Di Tommaso et al., 2023).

The global and evolving nature of events such as the COVID-19 pandemic has intensified discussions about the scale at which the effects of unexpected shocks are experienced and managed (Sharma et al., 2021). From an industrial level perspective, it becomes apparent that maintaining the continuity of individual business is intricately linked to maintaining the functioning of complex production networks and market structures that span regions and countries (Di Tommaso et al., 2023; Sharma et al., 2021; Haraguchi et al. 2016).

Studies on industrial resilience delve into the unique characteristics of industries and the external contexts that encompass location-specific features (Holm & Østergaard, 2015; Martin & Sunley, 2015). These insights highlight the role of complex local factors in shaping the boundaries within which individual strategic maneuvering occurs in the face of adversity (Boschma, 2015; Giannakis & Bruggeman, 2017). Furthermore, by showcasing the heterogeneous responses of industries to shocks, research on industrial resilience provides insights for the development of tailored vertical industrial policies that are relevant to policymaking (Di Tommaso et al., 2023). However, despite the growing academic interest in this area, comprehensive proposals that take into account both the internal characteristics of industries (Holm & Østergaard, 2015; Kurth et al., 2019) and regionally shaped conditions (Wójcik & Cojoianu, 2018; Xiao et al., 2018) are still lacking.

Additionally, the resilience domain remains unclear in terms of its relationship with related growth and development constructs (Hillmann & Guenther, 2021). Understanding this relationship is crucial because factors that support industry growth and development may not necessarily contribute to its resilience (Holm & Østergaard, 2015).

Based on these arguments, the approach of this study aims to address this gap by combining the above-mentioned perspectives and exploring the relationship between industry resilience and the factors that support its development, which in turn include both industry characteristics and regionally shaped economic conditions. We chose the hotel industry because of its recognized characteristics, which produce a unique combination of significant economic impact, high exposure and vulnerability to risk, and strong spatial embeddedness.

### Hotel industry development

The dynamically developing hotel industry is a key link in the tourism value chain (Mitchell et al., 2015) and, accordingly, its extensive cross-sectoral relationships generate significant multiscalar economic impacts at regional (Mitchell et al., 2015), national (Rivera, 2017), and international levels (Niewiadomski, 2015).

Furthermore, knowledge of the region's profile is required to determine the development potential of the sector. A region's profile is defined as a set of physical and social characteristics (Gilboa et al., 2015). According to Assaf et al. (2015), regional characteristics significantly impact hotel performance and best explain the dynamics of its changes. The hotel industry is deeply rooted in local conditions, despite the fact that the influence of regional factors on hotel

performance is rarely studied in the literature. Nonetheless, all studies analyzing this aspect emphasize the importance of regional attractiveness, which is a direct cause of tourist travel and affects hotel efficiency (Lee, 2015; Liu & Wang, 2002). More attractive regions have higher tourism potential (e.g., size and growth rate of the tourism industry) and receive more government investment (Chen, 2016; Barros et al., 2011). These markets also have greater access to tourism-related resources (Assaf & Josiassen, 2012). This view further supports the relationship between tourism development and hotel performance (Chen, 2010),

Therefore, location decisions have generally explained spatially determined differences in the development of the hotel industry (Yang & Cai, 2016) based on proximity, in relation to the amenities of tourist destinations and agglomeration economies (Canina et al., 2005; Valenzuela-Ortiz et al., 2022).

According to the researchers, more detailed factors that contribute to the development of the hotel industry are the number of tourist arrivals (Yang & Wong, 2013; Luo & Yang, 2014), access to resources, and leading suppliers or special services (Canina et al., 2005), legal regulations, socio-cultural and transport factors (Adam & Amuquandoh, 2013).

In addition, tourism development has a positive impact on the hotel industry (Chen, 2011; Yang et al., 2020). The expansion of international tourism contributes to an increase in the number of hotels in a region, thereby strengthening the overall hotel industry. As the number of hotels in a given region increases (Yang et al., 2014), tourism expansion can both directly and indirectly. On the one hand, international tourism can directly enhance hotel performance by increasing hotel occupancy rates and sales revenue (Chen, 2016; Ubeda-García et al., 2014). On the other hand, developing international tourism can indirectly enhance hotel performance by stimulating economic development (Kim et al., 2006). Dogru and Bulut (2018) state that tourism development can contribute to economic output and positively affect most sectors of the economy while improving the economy, which, in turn, can enhance hotel performance.

As mentioned above, regionally shaped conditions include location-specific amenities (Batista e Silva et al., 2021; Lado-Sestayo et al., 2020; K. H. Lee et al., 2018), economic structure (Calgaro et al., 2014; Zuo et al., 2021) and externalities generated by the destination's hotel establishments (Valenzuela-Ortiz et al., 2022). However, previous studies on the hotel industry's resilience have focused separately on either location-specific externalities (Cellini & Cuccia, 2019; Gong et al., 2020), internal industry characteristics (Filimonau et al., 2020; Krishnan et al., 2020), or intra-organizational factors (Melián-Alzola et al., 2020; Ntounis et al., 2022).

## Hotel industry resilience and its regionally shaped conditions

Among all tourism-related industries, hotels are characterized by the highest capital intensity (Lee et al., 2011; Singal, 2015) and long-term investment process (Liu & Hu, 2022). The pivotal dependency on tourist inflows determines the hotel location choices; conversely, it exposes the hotels to external shocks that generate significant, beyond seasonal, demand fluctuations (Brown et al., 2021; Pappas, 2018). Owing to the high fixed costs associated with service readiness, the flexibility to adapt to these external disruptions is limited (Baum et al., 2020), often only to the human resources management dimension (Baum et al., 2020; Ozdemir et al., 2021). The existing studies on hotel performance during global shocks discuss the general ability of the industry to withstand the caused demand turbulence (Cellini & Cuccia, 2019), however, they indicate certain variations when referring to less aggregated populations (regions), characterized by different conditions for the development of the hotel industry (Chen et al., 2007; Kubickova et al., 2019).

The differences discussed highlight the pre-crisis economic situation and structure of the hotel industry in a region (Calgaro et al., 2014; Kubickova et al., 2019) and the varied scale of the shocks studied – from localized events affecting selected industries and regions to global crises (Calgaro et al., 2014; Kosová & Enz, 2012; Kubickova et al., 2019). As the COVID-19 pandemic is a global crisis, it allows for a more thorough examination of regional differences in the impact of the shock on the hotel industry and its responses. However, based on available studies on global-type crises, while destination (Cellini & Cuccia, 2019; Filimonau & De Coteau, 2019), organization- (Duarte Alonso et al., 2020; Ntounis et al., 2022), and intra-organization level focused research (Aguiar-Quintana et al., 2021; Giousmpasoglou et al., 2021) have been gaining momentum, studies on resilience from the perspective of the hotel industry are scarce (Ozdemir et al., 2021).

Therefore, based on the argument that the hotel industry evolves differently across regions (Batista e Silva et al., 2021) because some regions provide more supportive conditions for hotel industry development than others (Yang & Cai, 2015; Holm & Østergaard, 2015), we decided to investigate whether these conditions are also conducive to hotel industry resilience. Therefore, we propose the following hypothesis:

H1: Hotel industry resilience exhibits a regional variation.

Given that amenity-driven, regionally agglomerated tourist inflows may differ significantly, for example, in terms of intensity, seasonality, or country of origin, hotel supply tends to exhibit diverse dynamics, resulting in distinct territorial structures (e.g., hotel chains, categorization, and size) and regionally differentiated hotel performance (Batista e Silva et al., 2021; Yang & Cai, 2016). Importantly, a common strategy of incorporating proximity to tourist attractions and access points leads to an agglomeration of hotels in a given location, which in turn can generate important spillover effects related to increased competition but improved performance (location conformity) (Canina et al., 2005; Valenzuela-Ortiz et al., 2022). Yang and Cai (2016) indicate that the influence of regional factors increases as the standard of a hotel rises.

The development of hotel chains is also important for the development of the industry. Hotels belonging to hotel chains perform better than independent hotels, achieving better total revenue, income per room, and total income (Tari & Pereira, 2012). Chains can offer a consistent value proposition with guaranteed quality, access to different amenities (Richard & Cleveland, 2016), and standard services to satisfy customers from different cultural backgrounds (Gao et al., 2018). The sales dimension is also relevant: hotel chains drive revenue growth through innovative financial structuring and total revenue management (Richard, 2017). According to Carvell et al. (2016), brand affiliation helps offset competition by reducing the impact of competitors' marketing activities.

In general, tourism demand is concentrated in places with rich natural and built amenity resources (Clark, 2011); therefore, the type, quantity, quality, and spatial distribution of these amenities are the key criteria in hotel location decisions (Batista e Silva et al., 2021; Lado-Sestayo et al., 2020). Proximity to significant social and natural attractions is a critical factor in hotel location decisions and performance, as travelers prefer a location that allows access to various services (Yang et al., 2012; Li & Du, 2018). Accessibility to significant social and natural attractions has a positive impact on hotel performance because tourists prefer hotels located near these sites (Rigall-I-Torrent & Fluvia, 2011; Li & Du, 2018). Travelers also prefer hotels located in areas with appropriate environmental quality and natural diversity, green protected areas (Sellers-Rubio & Casado-Díaz, 2018; Lee et al., 2015). As such, we propose the following hypotheses:

H2: Regional variation in hotel industry resilience is related to the structural characteristics of the hotel industry.

Given the labor-intensive nature of hotel services, a key externality affecting hotel productivity relates to the pool of trained employees generated in the local market (Valenzuela-Ortiz et al., 2022; Yang & Cai, 2016). Educational units are being developed in densely populated urban agglomerations, providing better access to qualified and competent staff to work in hotels. Therefore, agglomerations attract hotel chains and investors who want to build luxury brands for business tourists (Ribaudo et al., 2020).

However, when the demand for tourism services decreases, the demand for hotel services also decreases, leading to an increase in unemployment (Romão et al., 2016). Thus, the lack of economic resilience in the region accounts for the unprecedented level of job losses. The regional economic context considered in the resilience study also includes the level of salaries in the region (Masik, 2018). The available findings indicate that job cuts and salary freezes have been the main responses of business owners to the crisis.

The hotel industry also benefits from economic growth, stability, and development of destination communities. Research shows that central business districts (CBDs) and shopping malls attract business tourists and contribute to its development (Zhang et al., 2012; Ferreira & Boshoff, 2013). In addition, consumers prefer hotels with access to commercial clusters and convention centers (Li & Du, 2018). According to researchers, more detailed factors contributing to the development of the hotel industry include the economic condition of the region (Luo & Yang, 2014), GDP (Kalnins & Chung, 2004; Zhang et al., 2012; Luo & Yang, 2014), foreign investment (Zhang et al., 2012; Luo & Yang, 2014). In terms of GDP per capita, less developed regions were more vulnerable to recessionary shocks (Giannakis & Bruggeman, 2017). Public investment is crucial for hotel development and activation of a resilient response (Psycharis et al., 2022). Government support is also a critical factor in enabling the hospitality sector to weather crises (Asaf et al., 2017) including the one caused by the COVID-19 pandemic (Salem et al., 2021). Therefore, it is hypothesized as follows:

H3: Regional variation in hotel industry resilience is related to economic condition of the region.

## METHODOLOGY

In this study, the period from the first to the third wave of COVID-19 infections was selected as an unexpected external shock that has challenged the industry. Guided by the capability-based perspective, the study of the activated observable resilience response covered the critical timeframe of the selected disruption, i.e. March 2020 to December 2021. The detailed calendar of lockdowns and restrictions in Poland is presented in Appendix 1.

The study followed an exploratory and quantitative approach. The developed research procedure consisted of three stages: a) regional clustering of the hotel industry, b) assessment of the resilience of the hotel industry resilience across regional clusters, and c) verification of the differences between clusters in terms of regionally shaped economic, and hotel industry characteristics.

The research setting covered the hotel industry in Poland. Poland was selected because (a) the Polish hotel industry has shown visible resilience characteristics during past global adversities (e.g., lower impact and faster recovery from the 2007-2009 financial crisis compared to other EU countries (*Local Data Bank*, 2021), (b) the demand and supply conditions in the Polish hotel market reflect the specificity of the CEE regions (e.g., the low saturation of domestic demand combined with a low but dynamically growing number of hotels), and (c) Poland is characterized by significant regional heterogeneity not only in terms of natural amenities but also economic development (Majewska, 2015).

Given the regional contextual perspective of the study and the largely uneven spatial distribution of hotels across 16 regions in Poland, clustering analysis was used to define the appropriate research sample: clusters of regions with similar characteristics of the hotel industry prior to the COVID-19 pandemic (Pinto et al., 2019). The required information was retrieved from Polish public statistics on tourism (Statistics Poland and Local Data Bank - LDB), which is collected in accordance with European standards (OJ EU L 192 22.07.2011).

The study focuses strictly on the hotel industry, which, according to Polish law (Journal of Laws of 2017, item 2361), includes establishments with at least 10 rooms, most of which are single and double rooms, offering a wide range of services related to a customer's stay. The name 'hotel' can only be used by an entrepreneur who has successfully passed the formal verification and has been assigned to an appropriate category (i.e., similar to the whole Europe). Therefore, only officially categorized hotels were included in the analyses.

The clustering procedure involved three main variables and Ward's hierarchical cluster analysis with Euclidean distance:

- the average hotel occupancy in each of the 12 months of 2019 [HOcc] provides insight into the seasonality of demand in the industry (Pappas, 2018);
- the number of hotels in the region [HDens] is an indicator of the development of the hotel industry (Fang et al., 2021). The total number was used instead of the ratio to the size of the region because the development of the hotel industry development is determined by other factors such as the quality of the workforce (Yang & Cai, 2016); and
- the share of foreign tourists in the region [FTRatio] has a particularly strong impact on hotel performance (Barbhuiya & Chatterjee, 2020).

We used aggregated data at the NUTS-2 regional level (Brakman et al., 2015; Crescenzi et al., 2016) and defined three regional clusters (Figure 1). The significantly higher variable values obtained for the Malopolskie region are in line with its commonly recognized distinct position among regional tourist destinations in Poland (MOMR, 2020) and support its categorization as a distinct regional cluster.

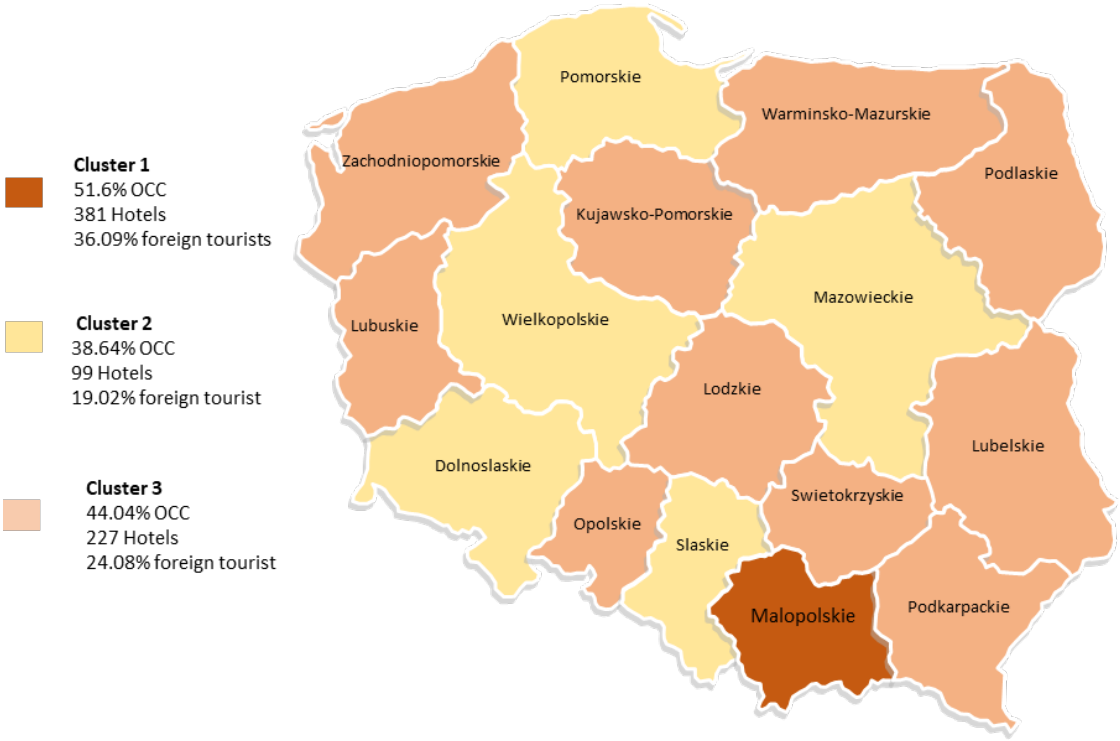


**Figure 1.** Map of defined regional clusters (indicated average values)

**Source:** Own study based on Statistics Poland (2021).

The next stage of the research was to assess the resilience of the hotel industry across regional clusters. For a more nuanced view, the focus was on the variation rather than the average level of hotel industry resilience. Therefore, the research effort was directed towards individual components of the construct, i.e. resilient response indicators (Hillmann & Guenther, 2021):

- change in the average occupancy rate of hotels – indicating the recovery time in terms of basic operations (Ozdemir et al., 2021). Data source: LDB;
- change in hotels' average debt – indicating the need to maintain access to critical resources (Chowdhury et al., 2019). Data source: proprietary databases of the Credit Information Office in Poland; and
- change in employment in the hotel sector – indicating the need to maintain the basic functional area (Khan et al., 2021). Data source: local offices of the Polish Statistical Office.

In order to test the variation, the 'decomposed' Seasonal Autoregressive Integrated Moving Average (SARIMA) was applied for each resilience response indicator from 2018 to 2021, ensuring a balance between the pre-COVID and COVID periods (Jollant et al., 2022). The SARIMA analysis, in SPSS was used to decompose the trends of the time series, and the trend functions were calculated from the resulting deseasonalised data. The coefficients of the regression lines for each of the clusters' trends were then compared using Potthoff analysis (Potthoff & Roy, 1964). Thus, both regression slopes and intercepts were tested across clusters.

Finally, the antecedents of the variations were examined. The defined set of variables included factors identified in existing studies as important for the development of the hotel industry development in a given destination (Table 1). The data used was collected at the end of 2019– the last full year before the COVID-19 pandemic – for each county in the regions. The share of legally protected areas was added to the section of hotel-specific variables, as it is crucial for hotel development, although it does not characterize hotel industry precisely.

Due to the violation of the normality assumption in the distribution, we verified which key economic and hotel-specific characteristics differed in each cluster using non-parametric ANOVA, namely the Kruskal-Wallis tests. At the beginning of this stage, we examined the correlation between the variables used for clustering and Kruskal-Wallis tests.

We found that there was only a modest correlation, which we considered acceptable to proceed with the subsequent analysis (see the results in Appendix 2). Post-hoc Dunn's tests were then used to present pairwise comparisons.

**Table 1.** Variables and their descriptions

| Variable | Description | Mean | Stand. dev. |
|---|---|---|---|
| *Hotel-specific variables* | | | |
| ECONHOT | Share of economy hotels (1-2-*star*) in the total number of hotels in the region [%] | 0.34 | 0.30 |
| MIDDLEHOT | Share of middle-class hotels (3-*star*) in the total number of hotels in the region [%] | 0.54 | 0.30 |
| LUXHOT | Share of luxury hotels (4-5-*star*) in the total number of hotels in the region [%] | 0.12 | 0.19 |
| CHAIN | Share of hotels belonging to branded hotel chain/systems [%] | 0.04 | 0.12 |
| PROTECTED_AREA | Share of legally protected areas in total area [%] | 28.81 | 23.02 |
| *Economic variables* | | | |
| SALARY | Average salary in the county [PLN] | 4,454.30 | 594.12 |
| UNEMPLOYMENT | Unemployment rate in the county [%] | 2.65 | 1.81 |
| INCOME | Self-income of the county per capita [PLN] | 1,031.17 | 1,278.94 |
| INVESTMENT | Investment outlays in enterprises per capita [PLN] | 4,063.34 | 4,505.02 |
| SUPPCOMPAN | Number of companies that received the first anti-COVID public aid | 955.08 | 1,594.74 |
| SHIELDPERCOMP | Average amount of the first anti-COVID public aid per company in the county [PLN] | 157,844.39 | 25,162.47 |

**Source:** Own study based on Statistics Poland, LDB, Polish Development Fund (2020, 2021).

## RESULTS

The 'decomposed' SARIMA models were statistically significant for each measure of the resilient response (Table 2). Furthermore, with the exception of the occupation change in Clusters 1 and 2, the Potthoff analyses revealed the differences in intercepts and slopes between clusters for each pair of trends (Table 3). Figures 2-4 also show that the decomposed trend (without seasonal correction) was associated with politically decided lockdowns and openings.

**Table 2**. Regression analyses on deseasonalized data

| Cluster | F | R-square | Intercept | Slope |
|---|---|---|---|---|
| *Occupation change* | | | | |
| 1 | 40.003*** | 0.454 | 73.508 | -1.110 |
| 2 | 42.989*** | 0.483 | 62.885 | -0.806 |
| 3 | 27.163*** | 0.371 | 50.94 | -0.487 |
| *Employment change* | | | | |
| 1 | 55.059*** | 0.540 | 5186.34 | -26.217 |
| 2 | 59.507*** | 0.564 | 24904.42 | -88.030 |
| 3 | 15.960*** | 0.258 | 13574.53 | -35.606 |
| *Debt change* | | | | |
| 1 | 869.292*** | 0.950 | 815623.9 | -6050.640 |
| 2 | 347.890*** | 0.883 | 750401.6 | 3319.241 |
| 3 | 229.838*** | 0.833 | 676072.1 | 1976.877 |

Note: *p<0.05; **p<0.01; ***p<0.001.

Government lockdowns led to significant declines in hotel occupancy across all regions, with less dynamic decreases in 2021 compared to 2020. While occupancy levels declined across the board, temporary recoveries were observed in the summers of 2020 and 2021, as well as in February-March 2021. According to the deseasonalised trend analysis, Cluster 3 displayed the highest resilience, being the only one to return to pre-pandemic occupancy levels. Although Clusters 1 and 2 did not have statistically different occupancy levels, Cluster 1 experienced more pronounced declines throughout the pandemic. This suggests varying resilience responses across clusters.

**Table 3.** Results of Potthoff analyses

| Cluster checked | R-square change | F change | Slope diff. | Intercept diff. |
|---|---|---|---|---|
| *Occupation change* | | | | |
| 1 & 2 | 0.018 | 1.578 | 0.304 | 10.623 |
| 1 & 3 | 0.097 | 8.421*** | 0.623** | 22.568*** |
| 2 & 3 | 0.047 | 3.990* | 0.319* | 11.945** |
| *Employment change* | | | | |
| 1 & 2 | 0.985 | 6066.774*** | 61.813*** | 19718.08*** |
| 1 & 3 | 0.976 | 1886.903*** | 9.389*** | 8388.190*** |
| 2 & 3 | 0.939 | 1261.159*** | 52.424 | 11329.890*** |
| *Debt change* | | | | |
| 1 & 2 | 0.941 | 1548.574*** | 9369.885*** | 65222.282*** |
| 1 & 3 | 0.946 | 688.813*** | 8027.521*** | 139551.723*** |
| 2 & 3 | 0.951 | 633.835*** | 1342.364*** | 74329.441*** |

Note: *p<0.05; **p<0.01; ***p<0.001.

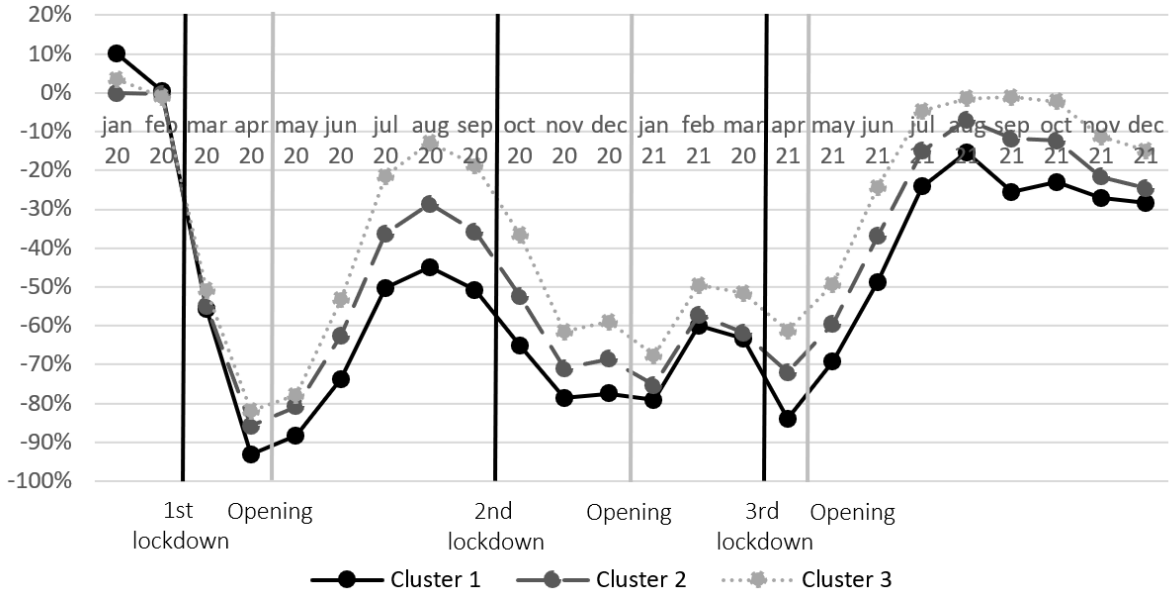


**Figure 2.** Change in hotels' average occupancy percentage as compared to 2019

The first lockdown initiated a decline in employment across all clusters, particularly pronounced in Cluster 3 (Figure 3). The partial reopening in May halted the trend, and in June, there was a significant increase in Clusters 2 and 3, albeit only slightly in Cluster 1. The analysis of deseasonalised trend supports this, with Cluster 1 having the lowest negative slope and intercept. The second lockdown further reduced employment across all clusters, with Cluster 1 experiencing even greater declines than during the first lockdown. The reopening in winter 2021 reopening benefited Cluster 1 (due to its mountain location), but significant declines reemerged in summer 2021, unlike Clusters 2 and 3 (which experienced less significant declines). It was therefore concluded that the resilience in employment changes varied across clusters.

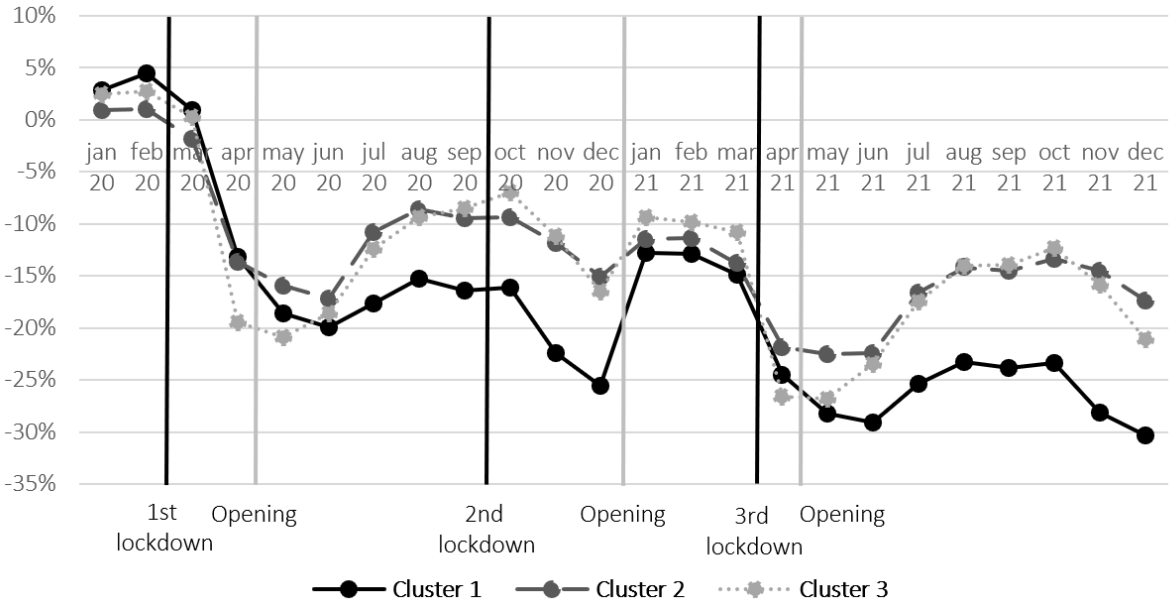


**Figure 3.** Changes in hotel industry employment compared to 2019

Debt data highlighted Cluster 1's unique profile: prior to the first lockdown, its hotels had a wider range of debt compared to Clusters 2 and 3, but experienced a steady decrease throughout the pandemic (Figure 4). Conversely, Clusters 2 and 3 experienced a slight increase in average debt per hotel. A notable decrease in debt in Cluster 1 in January 2023 coincided with an increase in employment due to the reopening of hotels in winter. The deseasonalised trend analysis confirmed significant differences between clusters, indicating varied resilience responses to changes in debt.

Taken together, the analysis results confirmed variations between clusters for all three indicators of the resilience response. Thus, H1 was supported.

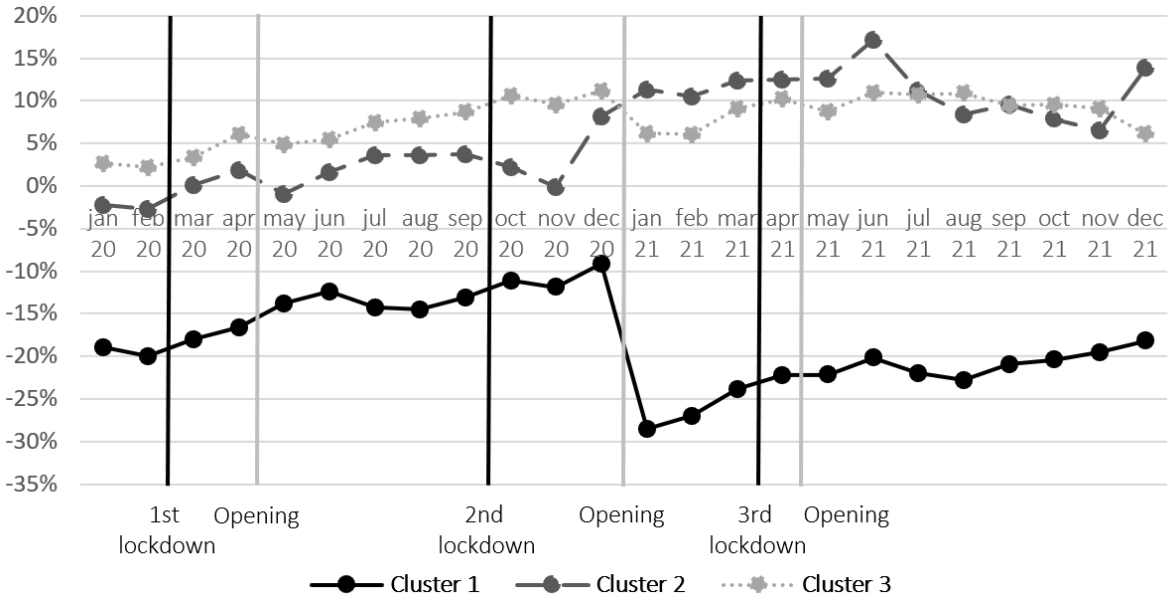


**Figure 4** Change in the average value of hotels' debt as compared to 2019

Kruskal-Wallis and Dunn's tests were used to examine the antecedents of the identified variation (Table 4). Among the hotel-specific variables, statistically significant differences were identified in two items: ECONHOT and CHAIN. The differences were observed between Cluster 1 and the other two clusters. For PROTECTED_AREA the difference was statistically significant between Cluster 2 and each of the other Clusters. Based on the results obtained, H2 was partially supported. In the group of economic variables, statistically significant differences were identified for INCOME, and UNEMPLOYMENT, as well as SUPPCOMPAN, and SHIELDPERCOMP. These differences were noticeable between Cluster 3 and the other two clusters. However, we found no significant differences between clusters in terms of SALARY and INVESTMENT. Given the majority of confirmed factors, H3 was supported.

**Table 4.** Clusters characteristics – means, Kruskal-Wallis H tests, and post-hoc Dunn's tests

| Variable | Mean for each subregion in cluster | | | H |
|---|---|---|---|---|
| | 1 | 2 | 3 | |
| *Hotel-specific variables* | | | | |
| ECONHOT | 15.7 | 34.3[a] | 35.5[a] | 7.947* |
| MIDDLEHOT | 64.5 | 53.0 | 53.4 | 4.348 |
| LUXHOT | 19.8[a] | 12.7[ab] | 11.2[b] | 8.281* |
| CHAIN | 6.42[a] | 5.91[a] | 2.7 | 11.620** |
| PROTECTED_AREA | 40.74[a] | 24.81 | 30.68[a] | 6.609* |
| *Economic variables* | | | | |
| INCOME | 879.98[a] | 1234.69 | 882.24[a] | 19.884*** |
| UNEMPLOYMENT | 1.91[a] | 2.04[a] | 3.24 | 56.117*** |
| SALARY | 4327 | 4501 | 4437 | 3.705 |
| INVESTMENT | 3130 | 4521 | 3806 | 2.716 |
| SUPPCOMPAN | 1616 | 1137 | 657 | 53.816*** |
| SHIELDPERCOMP | 157 784[ab] | 162 466[a] | 153 553[b] | 5.483** |

**Note:** For each variable (row), the means for different clusters with the same superscript (*a* or *b*) are not significantly different based on Dunn's post hoc tests; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

## DISCUSSION

The results confirmed the regional variation of hotel industry resilience across regions with different levels of hotel industry development (Kubickova et al., 2019; Yang & Cai, 2016). In terms of occupancy and employment, the most resilient were hotels from Cluster 3, regions generally considered to be socially and economically underdeveloped areas for tourism (but with unique natural amenities), which visibly lagged behind Clusters 1 and 2. Hotels in clusters 1 and 2, which were heavily dependent on foreign and business tourists, had to contend with with the introduction of a ban on the organization of traditional business events, the consequent loss of the ability to serve the key customer segment. With regard to the indebtedness indicator, a downward trend was observed in Cluster 1; but, this coincided with massive hotel liquidations and bankruptcies (Statistics Poland, 2021). Thus, the evidenced differences regarding individual indicators of a resilient response do not indicate a full correspondence with the level of hotel industry development in a given region, thus calling for a more thorough analysis of regional conditions in terms of their impact on both development and industry resilience (Holm and Østergaard, 2015).

The results indicate that some factors identified as supporting the development of the hotel industry in a given region do not have such a positive effect during the crisis and may even be adverse to the resilience of hotels. Notably, such factors were identified in both hotel industry characteristics and regional economic conditions.

Conformity in location has been found to improve hotel performance only for selected hotel segments and to increase risk for others. In general, co-location provides opportunities for externalities for all hotel segments (Vanezuela-Ortiz et al., 2022), particularly for economy hotels (Canina et al., 2005). However, a supportive effect was found only in economy hotels during the crisis. Previous studies have confirmed that lower-class hotels perform better during economic or environmental shocks (Kosová & Enz, 2012) while being less resilient to terrorist crises (Kubickova et al., 2019). In our study, regions dominated by economic hotels (Cluster 3 and 2) showed higher resilience, as these hotels benefited from

the increase in budget-oriented domestic travel and earned revenue by serving as medic hotels. In Cluster 1, dominated by luxury and chain hotels, being cut off from the key segment of foreign and business tourists meant going out of business (Krishnan et al., 2020; Sahlins, 2013).

In addition, the dense social fabric in Cluster 1, despite its extensive protected natural areas, discouraged tourists during the pandemic, as they preferred hotels in the less populated, 'green' regions of Poland (Cluster 3). During the pandemic, concerns about the risk of contracting the virus made travelers wary of more densely populated areas, creating uncertainty and anxiety that directly affected their sense of safety. This link between population density and tourist preferences has been intensively studied by researchers studying overtourism (Butler & Dodds, 2021; Yu & Egger, 2021) and crowd management (Filingeri et al., 2017 ). Therefore, Buhalis' recommendation (2000) that ensuring tourist safety should be an integral part of Destination Management Organizations' (DMOs) strategies for developing prosperous and sustainable destinations is increasingly supported by evidence. Research during the COVID-19 pandemic revealed a shift in travel preferences, with individuals seeking out destinations perceived as safer and previously less familiar to tourists and visitors (Neuburger & Egger, 2021; Kubickova et al., 2019). In our findings, safety was consistent with a desire for locations remote from densely populated areas. Furthermore, remote location areas with untapped market opportunities provided an incentive for tourism businesses to innovate and gain market advantages, such as pivoting towards local and ultra-local markets (Bhaskara et al., 2023).

Interestingly, while belonging to a hotel chain has historically been perceived as advantageous during crises due to corporate support (Filimonau et al., 2020; Le & Phi, 2021), the COVID-19 pandemic revealed that this association did not consistently confer benefits. Consistent with the findings of Krishnan et al. (2020) and Ozdemir et al. (2021), it was observed that despite the availability of corporate support funds and services, hotel chains were unable to significantly reduce their rates due to the imperative of maintaining their premium brand image. In addition, the dependence of hotel chains on the Tourism Supply Chain (TSC), which is vulnerable to the economic impact of pandemics and other disasters, made their situation more challenging (Tasnim et al., 2023). As a result, there is a growing recognition that hotel chains may need to realign their priorities, shifting their focus from operational efficiency to improving labor relations (Gonzales-Torres et al., 2021).

In this context, supply chain visibility is emerging as a critical success factor in building resilience in the hospitality and tourism sector (Jain et al., 2022). Effective supply chain management becomes imperative to meet the challenges posed by various crises - be it a natural disaster, economic crisis, international conflict, terrorism, or epidemic outbreak (Pizam & Fleischer, 2002; Chen & Chou, 2008; Jiang et al., 2019). Many hotels, resorts, and tourist destinations largely depend on tour operators for their promotion by word of mouth, visibility, and services (Gonzales-Torres et al., 2021). Tour operators are often associated with other tourism activities, such as controlling carriers and retailers along with controlling various important activities in the tourism and hospitality industry, including contracts related to payments, guarantees and release conditions. Therefore, the coordination-intensive nature of the hospitality industry presents inherent risks due to this high dependence on external partners. A disruption in any part of the supply chain can trigger cascading effects throughout the entire system (Folinas et al., 2004; Zhang et al., 2009), amplifying the sector's vulnerability to crises.

The study illustrates that the resilience of the hotel sector during the COVID-19 pandemic, and potentially in other crises, is intricately linked to the dynamics of the local labor market. Despite previous assertions linking high unemployment to reduced regional resilience (Soufi et al., 2022), our study reveals a nuanced landscape in which hotels in regions with elevated unemployment demonstrate greater adaptability. This observation contradicts traditional expectations and highlights the specificity of the hotel industry, which not only relies heavily on a low-skilled workforce (Baum et al., 2020) but also exhibits unique crisis response mechanisms distinct from other tourism sectors (Cellini & Cuccia, 2019; Ozdemir et al., 2021). Labor market accessibility emerges as a key regional attribute that afforded hotels greater flexibility in responding to the challenges posed by the pandemic (Yang & Cai, 2016). Furthermore, this study draws attention to the migration trend of hotel employees to other industries, particularly in economically prosperous regions, identified as Cluster 1 (Lee et al., 2018). Such regions offer a wide array of career opportunities, facilitating this labor shift. While this migration trend, is indicative of individual economic mobility, it raises pertinent questions about the long-term implications for the hotel sector and the broader regional economy. In particular, it highlights concerns regarding the sustainability of the sector's labor model and the quality of its contribution to regional economic externalities. Given these dynamics, it becomes clear that the relationship between unemployment and the resilience of the hotel sector is not linear, but is mediated by several factors, including the skill level of the workforce, the adaptability of hotels to crisis conditions, and the broader economic context of the region. This nuanced understanding suggests that policies aimed at

strengthening the resilience of hotel sector should consider not only labor market conditions but also the need for skill development, technological innovation, and economic diversification strategies. Such policies could enhance the sector's ability to respond to crises, while addressing the challenges posed by reliance on low-skilled labor and mitigating the adverse effects of high unemployment on regional economic health.

Furthermore, the effectiveness of government interventions to support the hotel industry during the pandemic highlights the often overlooked vulnerability of the sector and its reluctance to implement crisis management principles (Brown et al., 2017). Despite general efforts to provide assistance against COVID, hotels were at a distinct disadvantage, underscoring a systemic pattern of inadequate support during crises. This situation reflects the broader challenge of tailoring government aid to the specific needs of the hotel industry, a challenge that has historically been evident in responses to other crises, such as terrorist attacks or financial downturns (Kubickova et al., 2019). The contrast in aid efficacy is particularly notable when comparing different regional policies, as seen in China, where targeted measures in eastern regions offered tax reductions and financial incentives, while central regions focused more on tourist safety and inspections (Shao et al., 2020). These varied approaches suggest that a more nuanced, regionally adapted policy framework could better support the hotel industry, increase its resilience, and contribute to a more sustainable recovery from the crisis.

## CONCLUSIONS

Following this study's focus, we confirmed that the resilience of the hotel industry in Poland does not necessarily correspond to its level of development across regions. Based on the identified variations in resilience responses and in the regional conditions that shaped these responses to the COVID-19 pandemic, we verified the research hypotheses and formulated several important implications for theory and practice. The COVID-19 pandemic, while a profound crisis in its own right, served primarily as a lens that magnified and exacerbated pre-existing challenges within the broader tourism sector, particularly the hotel industry. Our findings suggest that the pandemic should not be seen as an isolated event but rather as a catalyst that has highlighted and brought into sharp focus long-standing issues that had been inadequately addressed in previous crises.This finding prompts a reassessment of resilience strategies and highlights the need for a more nuanced understanding of the factors contributing to the sustainability and development of the sector.

The implications drawn from our study underscore the urgent need for more resilient crisis management strategies applicable to the tourism sector as a whole. Our findings argue for a deeper understanding of human resource management, particularly given the high capital intensity and seasonal nature of the industry. With a significant proportion of small and medium-sized enterprises and a notable presence of the informal economy within the tourism sector (e.g., unrecorded income leading to difficulties in obtaining government support), unique challenges emerge, exacerbating issues for both employees and enterprises during crises and exposing systemic weaknesses in industrial relations and working capital maintenance. From a broader perspective, a nuanced understanding of agglomeration externalities, both during and beyond crisis periods, becomes paramount for strategic decision-making. The precarious status of workers, who are often among the lowest paid across various sectors, emphasizes the urgency of more secure labor relations and sustainable employment practices in the sector.

The collaboration among hotels, industry associations, and educational institutions is critical to developing more comprehensive, resilience-focused analyses of operational flexibility that go beyond human resource management. Such strategies should encompass effective supply chain management and a robust framework for labor security while addressing the need for skills development, technological innovation, and economic diversification. By adopting such approaches, the sector can build resilience to withstand multiple crises while addressing the challenges posed by reliance on low-skilled labor and mitigating the adverse effects of high unemployment on regional economic health.

Our findings also highlight the disparate impact of the pandemic on different segments of the hotel industry. While hotels in less densely populated areas were able to adapt to local demand and become safe havens, luxury and chain hotels, often reliant on international tourism and corporate bookings, faced harsher realities. This dichotomy stresses the urgent need for adaptable business models capable of navigating changing market conditions and crises. In addition, hotels should actively participate in the sustainable development of their communities, which is integral to their success (e.g., urban revitalization projects, green recreational spaces). This approach suggests the need for regional authorities to adopt more inclusive and open strategies in developing sustainable regional development policies.

In addition, the misalignment of government support during the pandemic provides an opportunity for regional multi-stakeholder discussions to develop appropriate policies. Firstly, policy makers should prioritize the development of regionally tailored support mechanisms to address the diverse challenges faced by hotels across different areas. This could include the introduction of financial incentives, tax reductions or targeted support programmes are tailored to the specific needs and characteristics of each region. Secondly, fostering greater collaboration between government agencies, industry associations, and hotel stakeholders is essential to ensure that support measures effectively address the sector's vulnerabilities. By working together, stakeholders can design and implement more targeted and effective interventions, thereby maximizing the efficacy of support measures.

Furthermore, policy makers need to consider the broader context of crisis management within the hotel industry. Given the sector's reluctance to implement crisis management principles, there is an urgent need for capacity-building initiatives. Providing training and resources to help hotels develop robust crisis management plans and strategies can significantly improve their preparedness and resilience in the face of future crises. Finally, ongoing monitoring and evaluation of government support programs are essential to assess their effectiveness and identify areas for improvement. By continuously refining and adapting support measures based on evaluation outcomes, policymakers can ensure that the hotel industry receives the support it needs to manage crises effectively.

These policies, which address both development and resilience, can then effectively influence and shape central policy-making with greater legitimacy and relevance. This understanding informs decisions on the location of hotel investments, the development of innovative value propositions and the diversification of business models.

Our research contributes to the development of resilience theory in the management field from an industry perspective, thus broadening the scope of the discussion beyond an individual business (Sharma et al., 2021; Di Tommaso et al., 2023). As such, the results obtained provide valuable insights into the complexity of regionally shaped antecedents of resilience (Xiao et al., 2018; Cellini & Cuccia, 2019). Importantly, the research included an integrated perspective that encompassed both the industry characteristics and economic conditions of specific regions (Di Tommaso et al., 2023), providing a strong, comprehensive basis for the arguments generated. The study revealed clear tensions between development and resilience impacts and confirmed that not all factors supporting hotel industry development in a particular region are equally conducive to its resilience (Holm & Østergaard, 2015). The study elucidates the existing trade-offs and thus strengthens the argument calling for a conceptual decoupling of resilience and development (Holm & Østergaard, 2015; Hilmann & Guenther, 2021) , as it assumes that their generally synergistic relationship is obsolete. It contributes to the ongoing discourse on the relevance of resilience as a distinct concept (Hilmann & Guenther, 2021) in the management field. Shifting attention to trade-off tensions advances both conceptual validity and application potential. The results obtained indicated that the differentiation of impacts applies to both groups of factors, i.e. industry characteristics and the regionally shaped economic conditions, provide a solid and promising starting point for further in-depth analyses of the relationship between development and resilience and, consequently, for the development of a conceptually coherent and distinct theory of resilience.

While we used data from institutional databases to derive implications for the industry as a whole, this approach lacked the insider perspective of hotel managers and employees. This points in the direction of future research, where official statistical data can be complemented by managerial insights. Moreover, the study period serves as a reliable material for comparative analysis in future timeframes, especially when using a similar study approach. While this study was tailored to the specific circumstances of the hotel industry, its approach can be replicated across various industries that are integral components of the supply and value chains of the tourism market. These industries, like hotels, are particularly vulnerable to crises. Examples include the transport industry, including airlines, bus, and rail services (Ritchie et al., 2010; Gössling et al., 2021) and tourism operators (Hall, 2009; Do et al., 2022). Furthermore, extending our research to other industries within the supply chain of the tourism market and its value chain could facilitate the exploration of building a resilience chain in the tourism sector. Such efforts could improve our understanding of how different sectors are interconnected and contribute to overall resilience within the tourism industry. Similarly, while this study was tailored to the specific circumstances of the country, its findings may be applicable to other Central and Eastern European (CEE) countries, thus creating potential for comparative studies across the region. Additionally, the approach developed, which takes into account regional differences in industry structure and economic conditions, offers a promising basis for conducting studies in other regions that exhibit similar variations.

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## **Appendix 1.** Covid 19 calendar

| | Date | Restrictions introduced for the tourism and catering industries |
|---|---|---|
| 1st lockdown | March 13, 2020 | Restriction on restaurants to serve takeaway meals only.<br>Closing gyms and swimming pools.<br>Ban on organizing meetings and parties |
| | March 23, 2020 | Restriction on movement outside of living, health and professional purposes. |
| | March 31, 2020 | Suspension of operations of hotel facilities and short-term rental places.<br>Staying on beaches and green areas is prohibited. |
| | April 16, 2020 | Restrictions on movement other than for living, health and professional purposes have been abolished.<br>The ban on staying on beaches and green areas has been lifted. |
| | **April 2020** | **Resilience indicators reach bottom values** |
| | May 4, 2020 | Resumption of hotel operations, except for recreational spaces such as swimming pools and fitness centers. |
| | May 18, 2020 | The order to serve meals only for takeaway has been lifted, and service in the premises while maintaining sanitary strictness. |
| | May 30, 2020 | Lifting the ban on organizing meetings and receptions up to max. 150 people.<br>Resumption of operations of swimming pools, saunas and fitness centers. |
| | **August 2020** | **Resilience indicators reach peak values** |
| 2nd lockdown | August 8, 2020 | Introduction of division of counties into green zones (without additional restrictions), yellow zones (with partial additional restrictions) and red zones (with strong additional restrictions);<br>In yellow zones, the number of people at special events is limited to 100, in red zones to 50.<br>In yellow and red zones, restrictions on the operation of restaurants and bars until 21 and limiting the operation of swimming pools and fitness centers. |
| | October 23, 2020 | The whole of Poland is declared a red zone.<br>Ban on organizing special events.<br>Suspension of stationary restaurant operations |
| | November 7, 2020 | Hotel services available only to people on business trips. |
| | December 17, 2020 | Further restriction of the availability of hotel services only to people on the list of permitted business trips. |
| | **January 2021** | **Resilience indicators reach bottom values** |
| | February 12, 2021 | Opening of hotels to all guests (while maintaining the sanitary regime).<br>Opening of swimming pools.<br>Gyms and restaurants remain unchanged. |
| | **February 2021** | **Resilience indicators reach peak values** |
| 3rd lockdown | March 20, 2021 | Limiting hotel operations to providing accommodation only to people on the list of permitted business trips.<br>Closure of swimming pools. |
| | **April 2021** | **Resilience indicators reach bottom values** |
| | May 3, 2021 | Opening hotels to all guests (while maintaining the sanitary regime, limiting the facility's occupancy to 50%, restaurants and wellness zones closed). |

| | Date | Restrictions introduced for the tourism and catering industries |
|---|---|---|
| 4th lockdown | May 15, 2021 | Allowing restaurant guests to be served outside (e.g., restaurant gardens) and maintaining the sanitary regime.<br>Possibility of organizing special events outside, max. for 25 people. |
| | May 29, 2021 | Allowing restaurant guests to be served inside while maintaining the sanitary regime.<br>Possibility of organizing special events inside, max. for 50 people. |
| | June 6, 2021 | Possibility to organize special events for max. 150 people.<br>Fully vaccinated people do not count towards the limit |
| | June 26, 2021 | Increasing the occupancy limit for hotels and restaurants to 75%. occupied rooms, the limit does not apply to organized groups of children and adolescents under 12 years of age.<br>Fully vaccinated people are not included in the limits |
| | **August 2021** | **Resilience indicators reach peak values** |
| | December 15, 2021 | Restaurants, bars and hotels – max. 30 percent occupancy by unvaccinated people.<br>Fully vaccinated people are not included in the limits |
| | March 1, 2022 | Lifting the limits, hotels can make 100% of their beds available again |
| | **May 16, 2022, the end of the epidemic in Poland** | |

**Appendix 2.** Correlation matrix of the variables used for clustering and Kruskal-Wallis tests

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Foreign tourists% | 1.000 | | | | | | | | | | | | | |
| 2. No. of hotels | 0.273** | 1.000 | | | | | | | | | | | | |
| 3. Occ% | 0.288** | 0.385** | 1.000 | | | | | | | | | | | |
| 4. ProLux | 0.071 | 0.248** | 0.298** | 1.000 | | | | | | | | | | |
| 5. ProMid | 0.043 | -0.011 | -0.085 | -0.278** | 1.000 | | | | | | | | | |
| 6. ProEco | -0.060 | -0.111* | -0.049 | -0.306** | -0.725** | 1.000 | | | | | | | | |
| 7. PROCHAIN | 0.218** | 0.190** | 0.223** | 0.230** | -0.081 | -0.039 | 1.000 | | | | | | | |
| 8. SALARY | 0.055 | -0.016 | 0.007 | -0.023 | -0.020 | 0.025 | -0.028 | 1.000 | | | | | | |
| 9. UNEMPLOYMENT | -0.280** | -0.170** | -0.142** | -0.132* | -0.031 | 0.104* | -0.148** | 0.030 | 1.000 | | | | | |
| 10. INCOME | 0.432** | 0.371** | 0.245** | 0.172** | 0.024 | -0.123* | 0.370** | -0.052 | -0.298** | 1.000 | | | | |
| 11. INVESTMENT | 0.060 | 0.099 | 0.017 | -0.030 | -0.016 | 0.013 | 0.028 | 0.439* | -0.001 | -0.017 | 1.000 | | | |
| 12. SUPPCOMP | 0.352** | 0.696** | 0.263** | 0.183** | -0.005 | -0.086 | 0.194** | -0.032 | -0.268** | 0.533** | -0.025 | 1.000 | | |
| 13. SHIELDPERCOMP | 0.232** | 0.191** | 0.125* | 0.101 | 0.073 | -0.100 | 0.136* | 0.023 | -0.377* | 0.372** | -0.019 | 0.339* | 1.000 | |
| 14. PROTECTED_AREAS | -0.289** | 0.037 | 0.015 | 0.050 | -0.009 | 0.011 | -0.117* | 0.033 | 0.115* | -0.265* | -0.073 | -0.097 | -0.167* | 1.000 |

Note: *p<0.05; **p<0.01.

## Biographical notes

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**Ewa Wszendybył-Skulska:** Conceptualization, Formal Analysis, Writing – Original Draft, Visualization, Project Administration. **Marta Najda-Janoszka:** Conceptualization, Formal Analysis, Writing – Original Draft, Writing – Reviewing & Editing. **Adam Jezierski:** Conceptualization, Formal Analysis, Writing – Original Draft, Data Curation, Methodology. **Szczepan Kościółek:** Data Curation, Methodology, Visualization. **Aleksander Panasiuk:** Writing – Original Draft, Supervision.

## Conflicts of interest

The authors declare no conflict of interest.

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