

Analysis on the Effects of COVID-19 Pandemic to the Tourist Arrival Trend in Caraga, Philippines through Linear Regression

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Abstract: *This study delves into the tourist arrival trends in Caraga, Philippines before and during the COVID-19 pandemic. The trends were compared using Linear Regression Analysis. Data were sourced from the Regional Social and Economic Trends 2022 in Caraga from the Philippine Statistical Authority-Caraga. The analysis of tourist arrivals in the Caraga Region, Philippines, from 2008 to 2021, reveals the dual impact of pre-pandemic growth and the COVID-19 pandemic. Linear regression models applied to domestic, foreign, and total tourist arrivals highlight distinct trends. Before the pandemic, strong relationships between the year and tourist arrivals were evident, particularly in the total arrivals model, reflecting robust growth. However, the pandemic shifted this dynamic, weakening the link between the year and arrivals in all categories. Lower coefficients and diminished R-squared values underscored the pandemic's disruptive influence, indicating external factors played a greater role. This emphasizes Caraga's tourism industry's resilience and adaptability, necessitating flexible strategies to navigate the complex interplay of global events and local tourism trends.*

Keywords: Tourism, Tourist Arrivals, Caraga Region, Linear Regression Analysis

I. INTRODUCTION

Tourism occupies a pivotal role in society, encompassing a wide range of economic, social, and cultural dimensions that collectively contribute to its profound significance. Primarily, tourism serves as a powerful engine for economic growth, injecting vital revenue into local economies and fostering employment opportunities across diverse sectors. Its financial influence is extensive, spanning accommodations, transportation, attractions, and culinary experiences. This economic infusion enhances livelihoods, stimulates business development, and cultivates economic resilience by diversifying revenue sources. Beyond its economic ramifications, tourism serves as a conduit for cultural exchange and appreciation. Travelers are exposed to a rich tapestry of traditions, art, cuisine, and historical landmarks, fostering cross-cultural understanding and tolerance. This cultural engagement goes hand in hand with the preservation of heritage sites and traditions, as local communities recognize the value of showcasing their identity to a global audience. The impact extends further, encouraging community development as tourism engenders opportunities for small-scale entrepreneurship, empowering residents to actively participate in the industry's growth.

The Caraga Region, situated in the northeastern part of Mindanao in the Philippines, presents a captivating canvas for tourism enthusiasts. Known for its diverse and compelling attractions, the region's tourism landscape has garnered attention for several distinctive features. One of its crown jewels is Siargao Island, which has earned international acclaim as the "Surfing Capital of the Philippines." Its legendary Cloud 9 surf break draws surfers from around the world, while the island's serene ambiance and vibrant local culture further enhance its allure. Beyond the shores of Siargao, Caraga's natural bounty offers a tapestry of landscapes, ranging from idyllic beaches with clear waters to enchanting waterfalls nestled within lush forests. Ecotourism thrives here, beckoning travelers to explore mountains, caves, rivers, and marine environments through activities such as trekking, bird-watching, and underwater adventures. These experiences showcase the region's rich biodiversity and provide a gateway to understanding the intricate connections between nature and culture. Cultural treasures abound in Caraga as well, as indigenous communities steeped in unique traditions offer a glimpse into their way of life. Visitors have the opportunity to engage with these

communities, gaining insights into their crafts, music, dances, and rituals. The historical narrative of the region is also woven into its attractions, with sites like the Balangay Shrine Museum in Butuan City, housing ancient boat relics and artifacts that shed light on its colonial past.

The global tourism industry has been severely impacted by the ongoing COVID-19 pandemic, with recovery projections indicating that tourism receipts are not anticipated to reach 2019 levels until 2023. The first half of the current year has witnessed a staggering decline in tourist arrivals worldwide, plummeting by over 65 percent. This abrupt downturn has been particularly acute since April, in stark contrast to the 8 percent drop observed during the global financial crisis and the 17 percent decline recorded during the SARS epidemic in 2003. These revelations stem from ongoing research conducted by the International Monetary Fund (IMF), shedding light on the unprecedented challenges faced by the tourism sector in a post-pandemic world (Behsudi, 2020).

The ramifications of this turmoil extend well beyond the tourism industry, deeply impacting economies on a global scale. The IMF's October World Economic Outlook projected a contraction of the global economy by 4.4 percent in the year 2020. However, the consequences for economies heavily reliant on tourism are projected to be significantly more severe. For African nations whose economies heavily hinge on tourism, a daunting contraction of 12 percent in real GDP is predicted. The forecast is equally grim for tourism-dependent Caribbean countries, where the economic decline is also estimated at 12 percent. Notably, Pacific island nations like Fiji are facing an even more staggering challenge, with their real GDP potentially shrinking by a staggering 21 percent in the current year. These dire statistics underscore the disproportionately negative impact of the pandemic on regions heavily reliant on tourism and the pressing need for global collaboration and recovery strategies to mitigate these repercussions.

II. LITERATURE REVIEW

The declaration of COVID-19 as a pandemic by the World Health Organization (WHO) on March 11, 2020, marked a watershed moment with profound repercussions across global realms (Sigala 2020). This pronouncement set the stage for a nuanced exploration of the pandemic's far-reaching effects on various dimensions—socio-cultural, political, and economic—with particular emphasis on its implications for the highly vulnerable global tourism industry (Rassy and Smith 2013). This discussion will delve into distinct themes that emerge from the provided insights, shedding light on the pandemic's intricate impact, the vulnerable facets of the tourism sector, and the urgent need for adaptive forecasting methodologies.

The pandemic's gravity materialized through a 78% plunge in the global tourist arrivals rate, catalyzing a substantial loss of nearly 120 million jobs and triggering a USD 1.2 trillion reduction in export revenues, underlining the monumental economic losses sustained (Sigala 2020; UNWTO 2020). Such staggering figures underscore the widespread economic devastation, notably pronounced in economies heavily reliant on tourism as their primary economic driver. The financial upheaval radiates beyond these statistics, infiltrating the socio-cultural fabric and political landscapes of affected regions. Tourism emerges as a particularly vulnerable sector in the face of crises, including diseases, epidemics, and pandemics, revealing a cycle of resilience and fragility (Lee and Chen, 2021). As a sector that thrives on the mobility and interactions of people, it becomes uniquely susceptible to disruptions. The pandemic-induced reduction in global tourist intentions reveals the pivotal role of global mobility in propagating the virus, contributing to a decline in travel enthusiasm due to heightened safety concerns (Ulak, 2020). Hoque et al.'s (2020) research delves deeper, spotlighting the psychological intricacies of tourists' cautious behavior amidst outbreaks. The sector's dependency on customer satisfaction and economic activities renders it both an essential and volatile cornerstone in many economies (Ma et al., 2020). The pandemic not only highlights the sector's vulnerabilities but also exposes the inadequacy of conventional forecasting models in predicting and managing global crisis events (Yu et al., 2020). The COVID-19 pandemic's unprecedented nature underscores the need for innovative methodologies to navigate the complexities of global crises. Effective forecasting mechanisms are not only critical for business resilience but also for informing policy decisions and shaping recovery strategies.

III. METHODOLOGY

The methodology adopted for this study revolves around a systematic analysis of secondary data sourced from the "Regional Social and Economic Trends 2022" report published by the Philippine Statistical Authority (PSA) for the

Caraga region. Anchored in the selection of this comprehensive data source, the study embarked on a meticulous process of data collection, compilation, analysis, and interpretation to unveil the intricate dynamics between the COVID-19 pandemic and the region's tourism sector.

The initial step entailed selecting the PSA report as the primary repository of relevant socio-economic indicators. This choice was pivotal in providing a rich array of data points pertaining to tourism, economic trends, employment, and other pertinent variables specific to the Caraga region. Drawing from this resource, the study undertook a thorough process of data collection, ensuring the accuracy and reliability of information extracted from the report.

Subsequently, the collected data underwent rigorous quantitative analysis, unveiling patterns, trends, and correlations within the dataset through Simple Linear Regression Analysis. The objective was to decipher the pandemic's impact on various facets of the tourism sector, scrutinizing changes in key indicators between pre-pandemic and pandemic periods. This analytical process aimed to discern nuanced shifts in tourist arrivals, economic growth, employment patterns, and export revenues attributable to the pandemic's disruptive influence.

IV. RESULTS AND DISCUSSION

The graph, Figure 1, depicting domestic tourist arrivals in the Caraga Region, Philippines from 2008 to 2021 reveals distinctive trends and significant events that have shaped the region's tourism landscape. Notably, the years leading up to 2019 were marked by consistent growth in tourist arrivals, indicating a positive trajectory in the region's appeal as a destination. Notable spikes in 2011 and 2013 underscored periods of substantial expansion. The pinnacle of this growth was reached in 2019, with a record high of 1,443,523 tourist arrivals. These trends are likely a result of infrastructure improvements, strategic marketing, and the region's natural attractions.

However, the outbreak of the COVID-19 pandemic in 2020 induced an abrupt and substantial deviation from the established growth pattern. The graph illustrates a sharp decline in tourist arrivals, plummeting to 274,086 visitors. This stark drop reflects the global impact of travel restrictions, lockdowns, and health concerns. The pandemic-induced decline serves as a clear illustration of the vulnerability of the tourism industry to external shocks.

In 2021, the graph portrays a partial recovery as the number of tourist arrivals climbed to 375,879. Although this number remains significantly lower than pre-pandemic levels, it suggests the region's resilience and adaptability in the face of adversity. The recovery is likely attributed to the gradual relaxation of travel constraints and the implementation of stringent health and safety measures. The graph's trajectory over these years encapsulates the overarching narrative of the tourism industry in the Caraga Region, reflecting growth, disruption, and a cautious resurgence. It underscores the intricate interplay between global events and local strategies in shaping the dynamics of tourism.

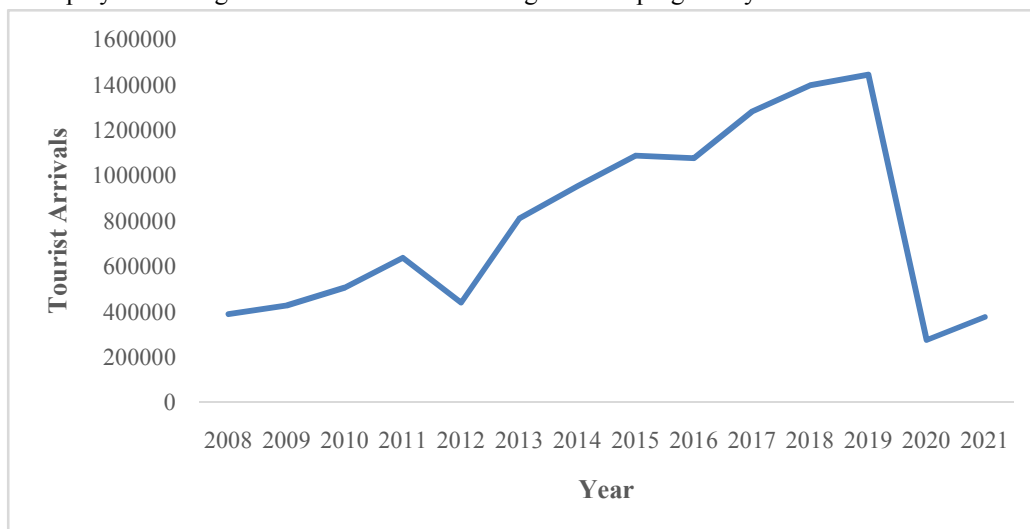


Fig. 1 Domestic tourist arrivals in Caraga, Philippines

The graph in Figure 2 depicting foreign tourist arrivals in the Caraga Region, Philippines from 2008 to 2021 unveils distinct patterns and pivotal events shaping the region's international tourism landscape. During the initial years, from 2008 to 2011, foreign arrivals exhibited relatively stable figures, oscillating between approximately 25,000 and 29,000

visitors. However, a remarkable surge occurred between 2012 and 2014, propelling foreign arrivals from about 25,000 to over 112,000, reflecting successful efforts in marketing and enhancing the region's appeal on the global stage. In the subsequent years, foreign arrivals displayed mild fluctuations, with a notable dip in 2015 followed by a partial recovery. These fluctuations were comparably less pronounced than the domestic arrivals, showcasing a relatively resilient international tourism sector. Yet, the advent of the COVID-19 pandemic in 2020 precipitated a sharp decline, reducing foreign arrivals to 22,752. This contraction was a direct result of international travel restrictions and health concerns that impeded global mobility.

The graph further underscores the prolonged effects of the pandemic, as 2021 witnessed a drastic drop to merely 1,562 foreign tourists. This substantial decline underscores the enduring challenges and uncertainties faced by the tourism industry in the region. It also emphasizes the necessity of innovative strategies to adapt to the evolving global landscape. The overarching narrative conveyed by the graph is one of fluctuating growth, resilience, and a profound impact from the pandemic. It provides a visual representation of the complex interplay between global events and local tourism dynamics, revealing both opportunities for expansion and vulnerabilities to external disruptions.

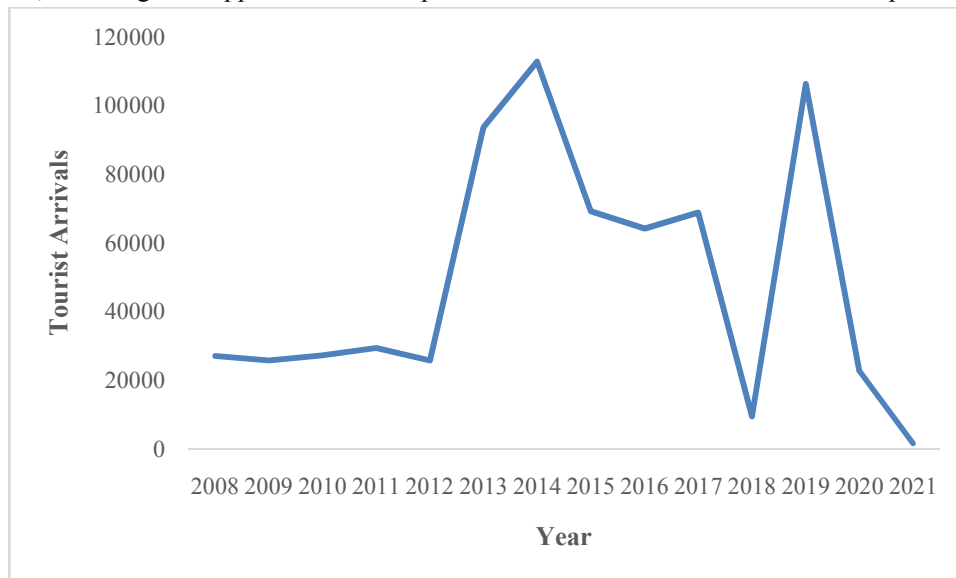


Fig. 2 Foreign tourist arrivals in Caraga, Philippines

The graph in Figure 3 portraying the total tourist arrivals in the Caraga Region, Philippines, from 2008 to 2021 unveils a compelling narrative of growth, disruption, and resilience. Prior to the onset of the COVID-19 pandemic, the region's tourism sector experienced a steady ascent in visitor numbers, showcasing a consistent growth trajectory. Commencing at around 417,000 in 2008, the figures progressively climbed, culminating in a peak of 1,544,755 arrivals in 2019. This upward trajectory reflects the region's appeal and successful efforts in attracting both domestic and foreign tourists. Noteworthy spikes in 2011 and 2014 underscore significant surges in total tourist arrivals. In 2011, the numbers surged to 667,658, indicating a considerable upswing in tourism activity. Similarly, the year 2014 marked a milestone as the figure exceeded one million, reaching 1,065,452 tourists. These instances point to the region's ability to attract and accommodate a diverse range of visitors.

The profound impact of the COVID-19 pandemic is conspicuously evident in the graph. The year 2020 witnessed a stark drop to 296,658 total arrivals, signifying the immediate repercussions of international travel restrictions, lockdowns, and health concerns. However, amidst these challenges, 2021 portrays a tentative recovery with an increase to 377,441 arrivals. This illustrates the region's resilience and adaptive strategies in navigating the evolving landscape of global tourism.

Ultimately, the graph encapsulates a journey of growth, disruption, and the endeavor to recover. It serves as a poignant reminder of the interconnectedness between global events and local tourism dynamics. While the pandemic posed unprecedented challenges, it also underscored the necessity of adaptability and innovation in ensuring the sustained growth and vitality of the Caraga Region's tourism industry.

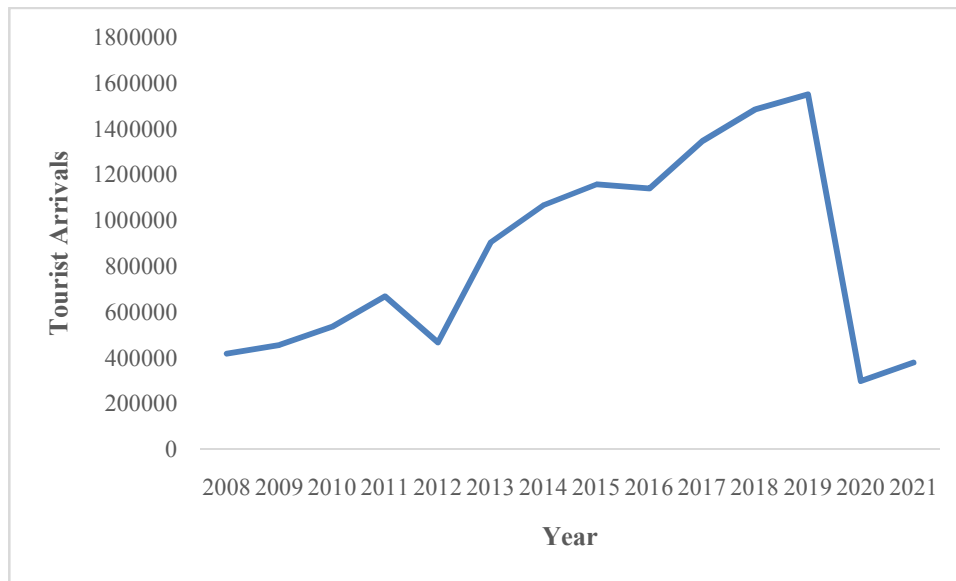


Fig. 3 Total tourist arrivals in Caraga, Philippines

Effects of COVID-19 Pandemic to the Tourist Arrival Trends in Caraga

The trends of tourist arrivals in Caraga are shown in Table 1.

The linear regression model applied to domestic tourist arrivals before the pandemic reveals a robust and statistically significant relationship between the year and the number of domestic tourists. The positive coefficient for the "Year" variable (105,104.801) indicates that, on average, domestic arrivals increased by around 105,105 visitors annually. The high R-squared value (0.942) suggests that approximately 94.2% of the variability in domestic arrivals can be explained by the year. The significant t-statistic ($t = 12.691$) underscores the statistical validity of this relationship. Conversely, the linear regression model for domestic tourist arrivals during the pandemic shows a less significant connection. Although the coefficient for the "Year" variable (37,527.270) remains positive, implying an average annual increase of approximately 37,527 arrivals, the lower R-squared value (0.146) indicates that only about 14.6% of the variation in domestic arrivals is attributed to the year. The t-statistic ($t = 1.433$) for the coefficient is not statistically significant, suggesting caution in interpreting this relationship.

The model for foreign tourist arrivals before the pandemic indicates a moderate level of significance. The positive coefficient for the "Year" variable (4,680.073) suggests an average yearly increase of approximately 4,680 foreign visitors. With an R-squared value of 0.225, about 22.5% of the variability in foreign arrivals can be explained by the year. Although the t-statistic ($t = 1.703$) for the coefficient is not highly significant, the model still indicates a discernible trend. The model for foreign tourist arrivals during the pandemic demonstrates a weaker relationship. Despite the positive coefficient for the "Year" variable (639.730), which implies an average annual increase of around 640 arrivals, the exceedingly low R-squared value (0.005) indicates that only a minimal 0.5% of the variation in foreign arrivals can be attributed to the year. The t-statistic ($t = 0.255$) for the coefficient is not statistically significant, raising questions about the practical significance of this relationship.

The linear regression model applied to total tourist arrivals before the pandemic highlights a robust relationship. The positive coefficient for the "Year" variable (111,852.224) suggests an average yearly increase of approximately 111,852 total arrivals. With a high R-squared value of 0.938, it is evident that around 93.8% of the variability in total arrivals is explained by the year. The significant t-statistic ($t = 12.288$) further supports the reliability of this relationship. In contrast, the linear regression model for total tourist arrivals during the pandemic demonstrates a somewhat weakened relationship. The coefficient for the "Year" variable (39,106.758) remains positive, implying an average annual increase of about 39,107 arrivals. However, the lower R-squared value (0.138) indicates that only approximately 13.8% of the variation in total arrivals can be attributed to the year. The t-statistic ($t = 1.387$) for the coefficient is not statistically significant, suggesting a certain degree of uncertainty.

TABLE 1. LINEAR REGRESSION ANALYSIS ON TOURIST ARRIVALS IN CARAGA, PHILIPPINES

Model			Coefficient	R Square	t	Sig.
Domestic	Before Pandemic	(Constant)	-210758247.958	0.942	-12.639	1.8E-07
		Year	105104.801		12.691	1.7E-07
	Pandemic	(Constant)	-74806315.793	0.146	-1.418	0.182
		Year	37527.270		1.433	0.177
Foreign	Before Pandemic	(Constant)	-9368411.094	0.225	-1.693	0.121
		Year	4680.073		1.703	0.119
	Pandemic	(Constant)	-1239927.207	0.005	-.245	0.810
		Year	639.730		.255	0.803
Total	Before Pandemic	(Constant)	-224282530.407	0.938	-12.237	2.4E-07
		Year	111852.224		12.288	2.3E-07
	Pandemic	(Constant)	-77933624.121	0.138	-1.372	0.195
		Year	39106.758		1.387	0.191

V. CONCLUSION

The comprehensive analysis of tourist arrivals in the Caraga Region, Philippines, spanning the years from 2008 to 2021, reveals an intricate interplay between dynamic factors, including pre-pandemic growth trajectories and the profound disruption caused by the COVID-19 pandemic. The linear regression models applied to three distinct categories—domestic, foreign, and total tourist arrivals—shed light on the evolving trends and their responses to external forces. Before the pandemic, the tourism landscape in Caraga exhibited promising growth, particularly evident in the strong relationships observed in the total tourist arrivals model. With an average annual increase of approximately 111,852 visitors, the model's high R-squared value (0.938) demonstrated that the year was a compelling predictor for this growth trend. Additionally, the domestic tourist arrivals model underscored the strong relationship between the year and domestic visits, with the model's high R-squared value (0.942) affirming the significance of the annual progression. However, the advent of the COVID-19 pandemic precipitated substantial shifts in the tourism dynamics. The subsequent models for each category during the pandemic unveiled weakened relationships between the year and tourist arrivals. With lower coefficients and diminished R-squared values, these models indicated that external factors beyond the year played a more influential role in shaping tourist flows during the pandemic. This paradigm shift underscored the pandemic's disruptive impact, as travel restrictions, health concerns, and economic uncertainties took precedence over historical growth patterns. Thus, the analysis highlights the resilience of the tourism industry in Caraga, its responsiveness to various circumstances, and the imperatives of adaptable strategies in navigating the complex interplay between global events and local tourism trends.

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