Linear Regression Analysis on the Hotel Accommodation Capacity in Surigao del Norte, Philippines

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Abstract: *This research explores the dynamics of hotel accommodation capacity in Surigao del Norte, Philippines, using data extracted from the "Regional Social and Economic Trends 2020" report by the Philippine Statistical Authority. Through Linear Regression Analysis, the study investigates the relationship between the number of hotels and years, and the number of hotel rooms and years, from 2009 to 2021. The analysis reveals a significant positive correlation between time and both hotel count and room capacity. The coefficients for the "Hotels" and "Rooms" models suggest an average annual increase of approximately 41.647 hotels and 270.684 rooms, respectively. The robust R-squared values of 0.653 and 0.612 highlight the substantial proportion of variability explained by the linear relationship. The hospitality sector in SurigaodelNorte has experienced remarkable growth in hotel accommodation capacity over the studied period. The findings underscore the province's emergence as a burgeoning tourist destination, evident from the consistent upward trajectory in both the number of hotels and rooms. This growth is not only indicative of economic prosperity but also calls for sustainable development strategies to balance tourism expansion and environmental preservation. The research emphasizes the pivotal role of data-driven analysis in understanding and shaping the trajectory of the tourism industry in the region.*

Keywords: Tourism, Hotel Accommodation Capacity, SurigaodelNorte, Linear Regression Analysis

I. INTRODUCTION

The burgeoning tourism industry plays a pivotal role in driving economic growth and development in various regions around the world. The Philippines, with its rich natural landscapes and cultural diversity, has been steadily attracting a growing number of tourists in recent years. Among its destinations, SurigaodelNorte stands out as a province offering a unique blend of coastal beauty, historical sites, and adventure opportunities. As the tourism sector expands, understanding the trends and factors shaping its growth becomes crucial for effective planning and sustainable development.

Hotel accommodation plays a pivotal role in the tourism industry, contributing significantly to the overall traveler experience, destination attractiveness, economic growth, and sustainable development. Beyond providing a place to rest, hotels shape the way travelers interact with a destination and the memories they take back. These accommodations offer a comfortable and secure environment that not only rejuvenates travelers after a day of exploration but also enhances their overall impression of a place. By offering diverse lodging options, hotels cater to a wide range of preferences and budgets, thereby attracting a broader spectrum of visitors and prolonging their stays. From an economic standpoint, hotels are powerful economic drivers, generating direct employment opportunities and creating demand for local goods and services. The revenue they generate circulates through the local economy, supporting restaurants, transportation services, and other local businesses. Furthermore, the taxes, fees, and licenses imposed on hotels contribute to public finances, enabling infrastructure development, community projects, and public services. This financial contribution is particularly important in regions reliant on seasonal industries like tourism. Hotel accommodations also play a pivotal role in determining a destination's competitiveness in the global tourism market. The quality and variety of available accommodations significantly influence a traveler's choice of destination. A well-developed range of lodging options not only appeals to different traveler segments but also adds to the overall allure of

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a place. In this way, hotels become catalysts for tourism growth by enabling tourism authorities to market the destination more effectively and attract a larger number of visitors. Moreover, the role of hotel accommodations extends to cultural and environmental sustainability. Responsible tourism practices can be promoted through well-managed hotels, which support local cultures, engage with communities, and implement eco-friendly initiatives. Such initiatives contribute to the preservation of cultural heritage and the reduction of the tourism industry's ecological footprint.

This research delves into the Hotel Accommodation Capacity in SurigaodelNorte, employing a linear regression analysis to explore the relationship between the number of hotels and the number of rooms over a span of thirteen years, from 2009 to 2021. By examining the impact of time, represented by the "Year" variable, on the growth of hotel accommodations, this study aims to shed light on the evolving dynamics of the province's hospitality sector. The analysis provides insights into the quantitative aspects of this growth, offering valuable information for stakeholders involved in tourism planning, local governance, and economic strategy. Moreover, this research aims to contribute to the broader understanding of how regional tourism evolves and adapts in response to changing market dynamics, policies, and global events. As SurigaodelNorte navigates the path of tourism expansion, an informed understanding of the factors driving hotel accommodation capacity is crucial for ensuring both economic prosperity and environmental sustainability.

II. LITERATURE REVIEW

The dynamism of the hospitality industry, intricately woven into the fabric of tourism, hinges on its ability to navigate the ever-changing currents of the tourism market. In this context, the imperative to adapt offerings to the evolving trends in tourism remains paramount. Present-day tourists, driven by a desire for immersive experiences, seek engagements that resonate with the cultural heritage of the destination. Embedding cultural narratives within innovative accommodation structures offers an avenue for authentic experiences, a bridge connecting the past to the present and imbuing a tourism destination with a competitive edge (Mandelli& La Rocca, 2006). This fusion of historical storytelling with modern-day comfort and engagement can serve as a potent catalyst for a destination's allure.

The contemporary traveler, however, aspires to move beyond surface-level engagement. Beyond mere sightseeing, souvenir hunting, and capturing iconic attractions through the lens, modern tourists aspire to embrace the essence of local life. This desire to seamlessly integrate into the local community is evident in their preference to experience life through the lens of the residents, intertwining their own journey with the fabric of the destination's daily existence (Camillo et al., 2015). This shift in tourist behavior has fueled collaborative endeavors within the hospitality realm, particularly among small entrepreneurs, sparking a rise in arrangements that nurture shared visions and engagement with local culture (Vlahov, 2014). At the heart of this lies the concept of arranged hospitality, rooted in collaborative relationships that foster virtual processes, recalibrate residential spaces, and rejuvenate tourism destinations (Russo, Lombardi &Mangiagli, 2013). This collaborative ethos breathes life into various accommodation forms – small family hotels, heritage hotels, integrated hotels, and diffuse hotels – all indispensable components of the tourist ecosystem.

Within this landscape of evolving expectations, a fundamental factor underpins the emergence of new and innovative accommodation forms: a receptive attitude towards change (Dragicevic, 2016). The acceptance of change as a driving force becomes a linchpin for future development. Akin to an artisan crafting a bespoke experience, personalized services hold the key to forging a memorable connection between tourists, the destination, and their chosen abode. A commitment to delivering unique, tailor-made experiences fosters a high level of satisfaction, setting the stage for enduring memories and ensuring a recurrent bond between travelers, the chosen destination, and the accommodations that facilitate these transformative journeys. In this symbiotic relationship, the hospitality industry plays a transformative role, infusing the sojourn with cultural authenticity and shaping the contours of travel experiences.

The hospitality and travel industry in the Philippines stands as a vibrant and rapidly expanding sector, contributing significantly to the country's economic landscape. As a multi-billion dollar enterprise, this industry is replete with excitement, offering boundless prospects for growth and innovation (Cariño, 2013). The World Travel and Tourism Council's (2014) report underscores the industry's pivotal role by revealing that in 2013 alone, travel and tourism directly generated 1,226,500 jobs, constituting 3.2% of total employment. This trajectory is projected to persist with an estimated 1.7% growth in 2014, resulting in 1,248,000 employments across various segments, encompassing hotels,

travel agencies, airlines, and related passenger transportation services, all while excluding commuter services. Furthermore, the realm of culinary delights and leisure experiences, directly supported by tourists, forms a vital component of this sector's dynamic. Looking ahead, the industry's potential remains resounding as travel and tourism are anticipated to contribute to a staggering 1,595,000 jobs by 2024, marking a remarkable 2.5% increase over the ensuing decade.

Within this burgeoning landscape, the hierarchy of hotel accommodation standards stands as a testament to the sector's commitment to quality and excellence. With five distinct levels, ranging from one to five stars, this classification system mirrors the diverse palette of travelers' preferences and expectations. Starting with the one-star tier, appealing to budget-conscious travelers, these establishments offer pragmatic facilities and services within the 25-40% achievement range or 251 to 400 points. Moving up the ladder, the two-star or economy category (40-55% achievement or 401 to 550 points) caters to those seeking more than the basics, providing heightened comfort and enhanced amenities. The three-star standard, exemplifying a 55-70% achievement or 551 to 700 points, boasts commendable accommodations, featuring spacious public areas, higher-grade facilities, and an expanded spectrum of services. Ascending further, the four-star or first-class hotels (70-85% achievement or 701 to 850 points) present upscale experiences marked by refinement and style. A comprehensive array of facilities accompanies their offerings. Finally, the zenith is epitomized by the five-star or De Luxe Class Hotel (85-100% achievement or 851 to 1,000 points), characterized by luxurious sophistication, world-class amenities, and impeccable service. This spectrum of accommodations reflects the industry's dedication to meeting varying preferences while upholding stringent standards set by the Department of Tourism (DOT).

Despite the industry's potential, unforeseen challenges, such as the COVID-19 pandemic, have disrupted global tourism and hospitality operations, including those in the Philippines. The pandemic underscored the importance of a resilient and adaptable tourism industry, one that can navigate disruptions while maintaining positive contributions to employment and the economy (Yparraguirre, 2023). Colliers' projection for increased hotel room completions in the Philippines reflects the anticipation of a resurgence in tourism, particularly from international markets such as China (O'Neill, 2022). As the Philippines works toward revitalizing its hospitality sector, addressing both immediate and long-term challenges will be crucial to ensuring the industry's continued growth and its role as a cornerstone of the nation's economy and culture.

While the hospitality industry encompasses a broad expanse of segments, including lodging, food and beverage, entertainment, recreation, and travel, this discussion centers primarily on the lodging segment's dynamic nature. This focal point underscores the significance of hotels as key players within the intricate web of the hospitality and travel industry, playing a vital role in economic growth, employment generation, and the crafting of unparalleled travel experiences.

III. METHODOLOGY

This study employs a quantitative methodology to explore the relationship between hotel accommodation capacity and time in the context of SurigaodelNorte. The data used for the analysis is sourced from the "Regional Social and Economic Trends 2020" report published by the Philippine Statistical Authority (PSA), which provides a comprehensive dataset on various socio-economic indicators, including hotel accommodation capacity, in the Caraga region.

The core analytical technique employed in the study is Linear Regression Analysis. This statistical method is chosen to investigate the potential linear relationship between two variables: the number of hotels (or hotel rooms) and time (years) within the specified period. Linear Regression Analysis aims to uncover patterns and trends within the data by establishing a mathematical relationship that best fits the observed data points. In this case, the dependent variable would be the number of hotels (or hotel rooms), while the independent variable would be time (years).

To execute the Linear Regression Analysis, the research first involves data preparation, including the extraction of the relevant data points from the "Regional Social and Economic Trends 2020" report. Once the dataset is assembled, the researcher applies statistical software tools to perform the regression analysis. This involves calculating the coefficients for the linear equation that best represents the relationship between the variables. The regression equation was in the form of:

Number of Hotels (or Rooms) = Constant + Coefficient * Year

The resulting coefficients will provide insights into the rate of change in hotel accommodation capacity over time. The constant represents the initial value of the dependent variable when the independent variable is zero (in this case, the starting year), and the coefficient represents the average change in the dependent variable for a unit change in the independent variable (each passing year).

IV. RESULTS AND DISCUSSION

The graph, Figure 1,presents the trend of the number of hotels in SurigaodelNorte over a span of thirteen years, from 2009 to 2021. During this period, there is a noticeable upward trend in the number of hotels, suggesting a growing tourism and hospitality sector in the province. In 2009, there were 51 hotels, and this number gradually increased to 624 hotels by 2021. Between 2009 and 2011, there was a modest increase in hotel numbers, with the count rising from 51 to 56. However, from 2013 onwards, there was a more rapid expansion, as the number of hotels jumped from 72 in 2013 to 624 in 2021. It's particularly noteworthy that a substantial surge occurred between 2015 and 2020, with the number of hotels skyrocketing from 164 to 598, indicating a period of significant investment and development in the hospitality industry.

This growth trend could be attributed to various factors, such as increasing tourism interest in the region, improved infrastructure, and possibly government initiatives to promote tourism and hospitality businesses. The substantial rise in hotel numbers could have brought both economic opportunities and challenges to SurigaodelNorte. While the increased accommodations could enhance the local economy through tourism revenue and job creation, it also poses the need for sustainable management to ensure the environment and local communities benefit from this growth. This result underscores a positive growth trajectory in the number of hotels in SurigaodelNorte over the specified period. This trend indicates the region's potential as a tourist destination and reflects the economic development driven by the tourism and hospitality sector.
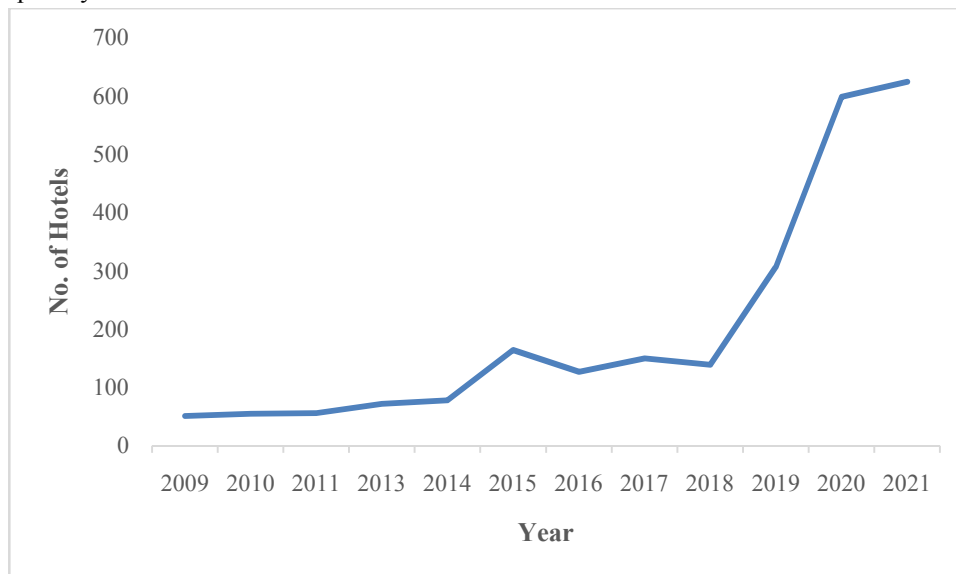

Fig. 1 Number of Hotels in Surigao del Norte, Philippines

The provided data in Figure 2 offers a clear insight into the dynamic growth of the hospitality sector within SurigaodelNorte over this thirteen-year span. Beginning at 226 rooms in 2009, the province's hotel room capacity expanded significantly, reaching a peak of 4200 rooms in 2021. In the initial years, there was a steady and gradual increase in the number of hotel rooms, as the count rose from 226 rooms in 2009 to 485 rooms in 2011. Subsequently, from 2013 onwards, the pace of growth accelerated notably. The surge in the number of rooms became particularly evident between 2015 and 2021, when the count soared from 2173 rooms to 4200 rooms.

This remarkable growth can be attributed to a combination of factors, including SurigaodelNorte's natural beauty, cultural attractions, and the increasing recognition of the Philippines as a desirable tourist destination. The surge in

hotel room capacity likely reflects the province's strategic efforts to capitalize on its unique offerings and tap into the growing tourism industry.

While this growth presents economic opportunities, it also necessitates careful planning and sustainable management. Striking a balance between development and environmental preservation is crucial, given the province's delicate ecosystems and cultural heritage. Ensuring that this growth benefits local communities and respects the environment will be vital for the long-term success of the hospitality sector in SurigaodelNorte. The data reveals an impressive expansion in the number of hotel rooms in Surigao del Norte, Philippines, from 2009 to 2021. This growth signifies the region's growing appeal as a tourist destination and underscores the importance of responsible and sustainable tourism development to ensure lasting benefits for both the local economy and the environment.
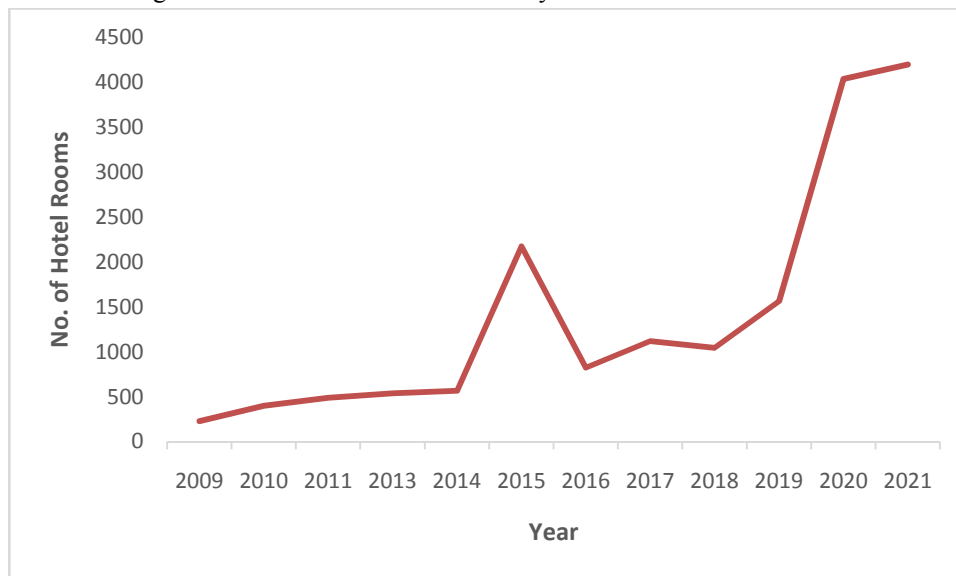

Fig. 2   Number of Hotel Rooms in Surigao del Norte, Philippines

Regression Analysis on Hotel Accommodation Capacity

The provided table presents the results of a linear regression analysis for the Hotel Accommodation Capacity in SurigaodelNorte. This analysis focuses on the variables of "Hotels" (number of hotels) and "Rooms" (number of rooms), and their relationship with the variable "Year" over the period from 2009 to 2021.

For the "Hotels" Model:

The regression equation for the number of hotels is presented as follows:

$$Hotels = -83728.001 + 41.647 * Year$$

The "Hotels" model coefficients indicate that the constant term is -83728.001, and the coefficient for the "Year" variable is 41.647. The coefficient for "Year" suggests that, on average, the number of hotels in SurigaodelNorte increases by approximately 41.647 units per year. The R Square value of 0.653 indicates that around 65.3% of the variability in the number of hotels can be explained by the linear relationship with the "Year" variable. The t-statistic for the "Year" coefficient is 4.336, and the associated p-value of 0.001 is below the typical significance level of 0.05, indicating that the relationship between the number of hotels and the year is statistically significant.

For the "Rooms" Model:

The regression equation for the number of rooms is presented as follows:

$$Rooms = -544064.540 + 270.684 * Year$$

Similarly, for the "Rooms" model, the constant term is -544064.540, and the coefficient for the "Year" variable is 270.684. This coefficient implies that, on average, the number of rooms in SurigaodelNorte hotels increases by approximately 270.684 units per year. The R Square value of 0.612 indicates that around 61.2% of the variability in the number of rooms can be explained by the linear relationship with the "Year" variable. The t-statistic for the "Year" coefficient is 3.973, with a p-value of 0.003, also indicating statistical significance.

Both models suggest a statistically significant positive relationship between the year and the number of hotels as well as the number of rooms in SurigaodelNorte. The coefficients for the "Year" variable in both cases are positive, indicating an increasing trend over the years. However, it's important to note that while the models explain a substantial portion of the variability in the data, other factors beyond the scope of this analysis could also influence the hotel and room capacity growth.

TABLE 1. LINEAR REGRESSION MODELS ON HOTEL ACCOMMODATION CAPACITY IN SURIGAO DEL NORTE, PHILIPPINES

Model		Unstandardized Coefficients		R Square	t	Sig.
		B	Std. Error			
Hotels	*(Constant)*	-83728.001	19355.891	0.653	-4.326	.001
	Year	41.647	9.605		4.336	.001
Rooms	*(Constant)*	-544064.540	137316.118	0.612	-3.962	.003
	Year	270.684	68.138		3.973	.003

V. CONCLUSION

The linear regression analysis conducted on the Hotel Accommodation Capacity data for SurigaodelNorte from 2009 to 2021 reveals compelling insights into the province's hospitality sector growth. The analysis focused on the number of hotels and the number of rooms as predictors, with the year as the independent variable. The results illustrate a strong positive relationship between the passage of time and the expansion of both hotels and room capacity. The regression coefficients for both "Hotels" and "Rooms" models are positive and statistically significant, indicating a consistent upward trajectory in the hospitality industry over the study period.

The models provide valuable quantitative information about the rate of growth. On average, the number of hotels increased by approximately 41.647 units per year, while the number of rooms expanded by around 270.684 units annually. The substantial R Square values of 0.653 and 0.612 for the "Hotels" and "Rooms" models, respectively, suggest that a significant proportion of the variability in these capacities can be explained by the linear relationship with the year. It's important to consider that while these models offer predictive insights, other factors such as economic conditions, tourism trends, and local policies could also influence the observed growth. The findings underscore SurigaodelNorte's emergence as a burgeoning tourist destination, requiring prudent planning to sustain this expansion while ensuring responsible development and preservation of local ecosystems and cultural heritage.

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