Research Article

Visitor Capture Metrics: Research Note on a Six-year Correlation Analysis of Provincial Tourists and Museum Visitors

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The research note endeavors to show that Department of Tourism (DoT) provincial level visitor counts are directly and positively correlated to National Museum of the Philippines Regional Component Museum (NMP-RCM) visitor counts. In some cases, the correlation between DoT and NMP-RCM visitor counts was very high, with Kendall's Tau values approaching 1.0. While this indicates a strong association, these values should be interpreted with caution and not assumed to represent mathematically perfect correlations without further statistical validation. The research covers the years 2018 to 2023.

The research note attempts to lay initial groundwork for more robust quantitative measurements in visitor targets for museums. A concept that is initially introduced here is *visitor capture*, which is the portion of province-level visitor arrivals who actually visited a local museum.

Introduction

The National Museum of the Philippines (NMP) is the primary National Government Agency (NGA) mandated to manage and develop museums and collections with a national scope of significance in the areas of Fine Arts, Anthropology, and Natural History (Republic Act No. 11333)[1].

The NMP has eight (8) curatorial divisions, including Ethnology, Archaeology, the Maritime Underwater Cultural Heritage Division under the Museum of Anthropology, the Botanical and Natural Herbarium Division, the Zoology, the Geology and Paleontology under the Museum of Natural History, and the Fine Arts and Architectural Arts and Built Heritage Division under the Museum of Fine Arts. The three central museums complex are in the City of Manila, whereas as much as seventeen (17) Regional Component Museums (RCMs) are found all over the archipelago. The NMP apparatus aims to reach out to local

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communities in carrying out its research and museology functions. Its longitudinal research agenda addresses global challenges through its alignment with Sustainable Development Goals (SDG), the country's Philippine Development Plan (PDP), and even the National Security Policy (NSP) (NMP Research Agenda 2028)[2].

Methods

Out of seventeen (17) operating NMP-RCMs at present, only ten (10) were included based on continuous historical recording of visitor data through the years 2018 to 2023 (Fig. 1). Due to the small sample size and the presence of skewed data distributions, Kendall's Tau was used as the primary non-parametric correlation coefficient. Spearman's Rho was also computed for comparative purposes, though interpretation focused primarily on the Kendall results. This entailed converting the interval ratio scale data points into ordinal or ranked scale data.

Figure 1. Provinces with 6 year NMP-RCM data as well as DoT data for correlation analysis

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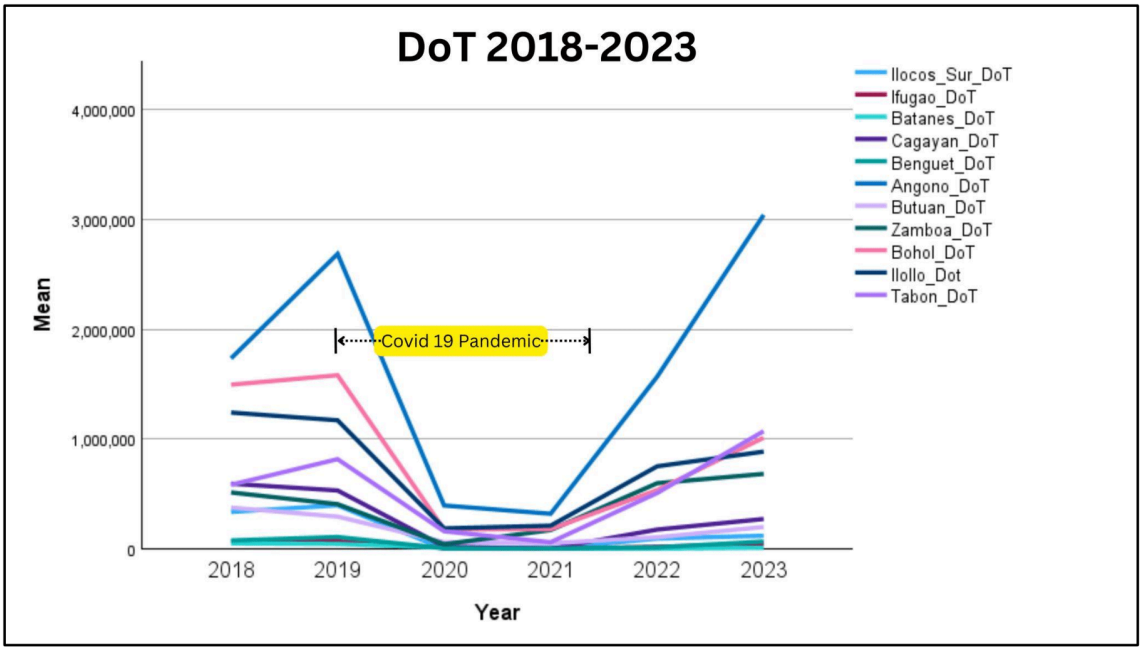

Figure 2. Line graph showing trends in DoT data (note the saddle caused by the COVID-19 pandemic)

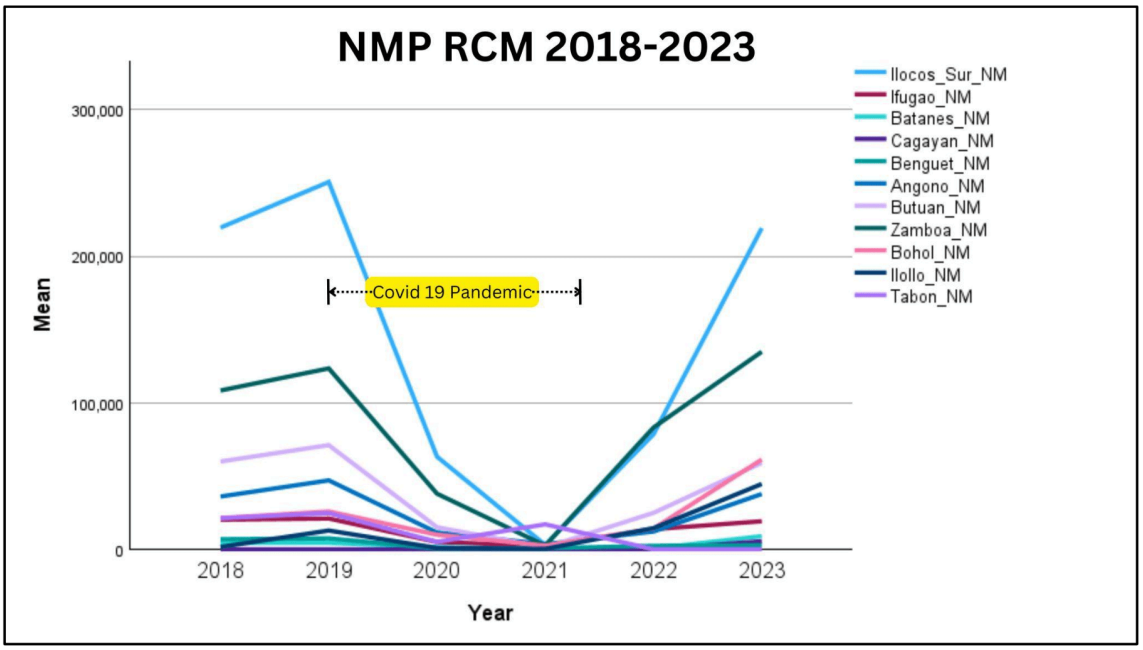

Figure 3. Line graph showing trends in NMP_RCM data (note the saddle caused by the COVID-19 pandemic)

The matching provincial Department of Tourism (DoT) annual visitor data was then retrieved from the DoT server for the years 2018 to 2023. In preparation for the non-parametric correlation of this data with

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NMP-RCM data, the interval ratio scale data points were also converted into ordinal or ranked scale data.

As a preliminary to the correlation analysis, data descriptives grouping and summarizing was first undertaken. Line graphs were plotted to see trends in the 6 year period (Figs. 2, 3).

Results

Out of the ten (10) NMP-RCMs, five (5) show strong positive correlation scores. The list includes the NMP RCMs in Ilocos Sur, Ifugao, Benguet, Angono, and Butuan.

These are summarized in Table 1, with results for NMP Ilocos Sur (Fig. 4), NMP Benguet (Fig. 5), and NMP Ifugao (Fig. 6) also presented as examples. Note the Kendall tau's non-parametric correlation score of the 5 NMP-RCMs. The Spearman's rho is also included for comparative purposes only. Kendall's tau is preferred; however, due to the high correlation values of the NMP-RCM and DoT data.

NMP RCM	**Kendall's Tau**	**Statistical Significance**	**P-value**	**Confidence Interval (2-Tailed, 95% CI)**	*Spearman's Rho (comparative only)*	*Statistical Significance (comparative only)*
Ilocos Sur	**0.87**	**0.05 level**	**0.015**	**LL (0.383) UL (0.977)**	*0.94*	*0.01 level*
Ifugao	**1.00**	**0.01 level**	**N/A**	**N/A**	*1.00*	*0.01 level*
Benguet	**0.87**	**0.05 level**	**0.015**	**LL (0.383) UL (0.977)**	*0.94*	*0.01*
Angono	**0.87**	**0.05 level**	**0.015**	**LL (0.383) UL (0.977)**	*0.94*	*0.01*
Butuan	**0.87**	**0.05 level**	**0.015**	**LL (0.383) UL (0.977)**	*0.94*	*0.01*

Table 1. Summary showing strong to perfect direct positive correlation between NMP-RCM and DoT visitor data.

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NMP Ilocos Sur

			Rank of Ilocos_Sur_NM	Rank of Ilocos_Sur_DoT
Kendall's tau_b	Rank of Ilocos_Sur_NM	Correlation Coefficient	1.000	.867*
		Sig. (2-tailed)	.	.015
		N	6	6
	Rank of Ilocos_Sur_DoT	Correlation Coefficient	.867*	1.000
		Sig. (2-tailed)	.015	.
		N	6	6
Spearman's rho	Rank of Ilocos_Sur_NM	Correlation Coefficient	1.000	.943**
		Sig. (2-tailed)	.	.005
		N	6	6
	Rank of Ilocos_Sur_DoT	Correlation Coefficient	.943**	1.000
		Sig. (2-tailed)	.005	.
		N	6	6

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 4. Correlation analysis of NMP Ilocos Sur data and DoT Ilocos Sur data.

NMP Kabayan

			Rank of Benguet_NM	Rank of Benguet_DoT
Kendall's tau_b	Rank of Benguet_NM	Correlation Coefficient	1.000	.867*
		Sig. (2-tailed)	.	.015
		N	6	6
	Rank of Benguet_DoT	Correlation Coefficient	.867*	1.000
		Sig. (2-tailed)	.015	.
		N	6	6
Spearman's rho	Rank of Benguet_NM	Correlation Coefficient	1.000	.943**
		Sig. (2-tailed)	.	.005
		N	6	6
	Rank of Benguet_DoT	Correlation Coefficient	.943**	1.000
		Sig. (2-tailed)	.005	.
		N	6	6

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 5. Correlation analysis of NMP Kabayan data and DoT Benguet data.

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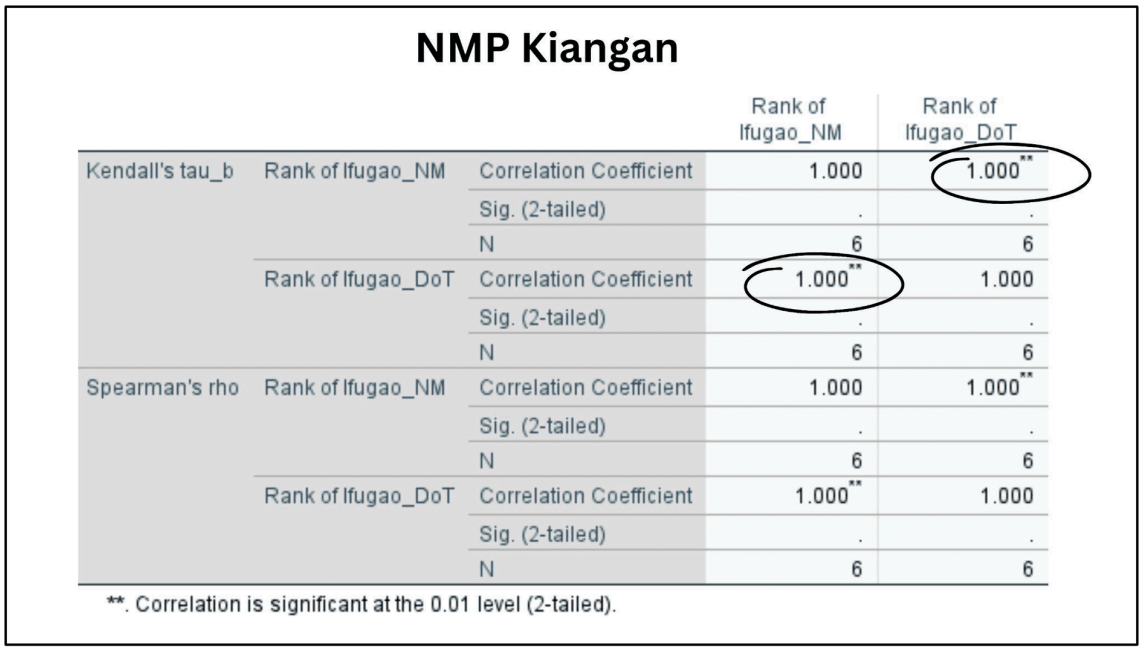

NMP Kiangan

			Rank of Ifugao_NM	Rank of Ifugao_DoT
Kendall's tau_b	Rank of Ifugao_NM	Correlation Coefficient	1.000	1.000**
		Sig. (2-tailed)	.	.
		N	6	6
	Rank of Ifugao_DoT	Correlation Coefficient	1.000**	1.000
		Sig. (2-tailed)	.	.
		N	6	6
Spearman's rho	Rank of Ifugao_NM	Correlation Coefficient	1.000	1.000**
		Sig. (2-tailed)	.	.
		N	6	6
	Rank of Ifugao_DoT	Correlation Coefficient	1.000**	1.000
		Sig. (2-tailed)	.	.
		N	6	6

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 6. Correlation analysis of NMP Kiangan data and DoT Ifugao data.

Discussion

Five (5) out of ten (10) NMP-RCMs showed positive correlation scores with DoT data that were considered statistically significant based on the computed Kendall's Tau values. Exact p-values and confidence intervals for these correlations are provided in Table 1. The other NMP-RCMs data points reveal temporal scale outliers that may be due to local idiosyncrasies such as changing local management articulations, infrastructure developments (repairs and restorations, building new sites, etc...), among others. There may also be datapoints influenced by geographic variables that present challenges in the accuracy of recording visitor arrivals in a province. For instance, an island environment is generally considered quite open due to its continuous shorelines with multiple possibilities for entry points. This may be the case with Panay or Negros Island, which have numerous entry points. But not all islands are created equal; there are also islands that have limited points of entry like Batanes. Such factors need to be used for calibration purposes at the outset of data recording.

Conclusion

The analysis clearly shows some statistically significant results for the branches of Ilocos Sur, Ifugao, Benguet, Angono, and Butuan. Because of the consistently strong correlations observed in select

provinces, this study proposes that DoT visitor data could serve as a useful indicator when setting or evaluating visitor targets for NMP-RCMs. However, these findings are correlational and do not imply a direct causal relationship. This ratio—referred to here as 'visitor capture'—may offer a useful means of verification (MOV) for assessing the extent to which an NMP-RCM reaches provincial tourists. However, further validation is needed to establish its reliability as a performance indicator, particularly given variation in museum accessibility and data reporting accuracy.

This measure, *visitor capture*, is the ratio of NMP-RCM visitors to DoT provincial visitors. Analysis of visitor capture also highlights some idiosyncrasies that exist among the NMP-RCMs. For instance, in the year 2023, the DoT recorded 10,134 visitors who arrived in Batanes. NMP Batanes welcomed 8,982 of these visitors, an equivalent of 89% *visitor capture* (Fig 7).

Ration NMP RCM/ DoT Year 2023

Province	Ratio
IlocosSur	1.83
Ifugao	0.45
Batanes	0.89
Cagayan	0.02
Benguet	0.04

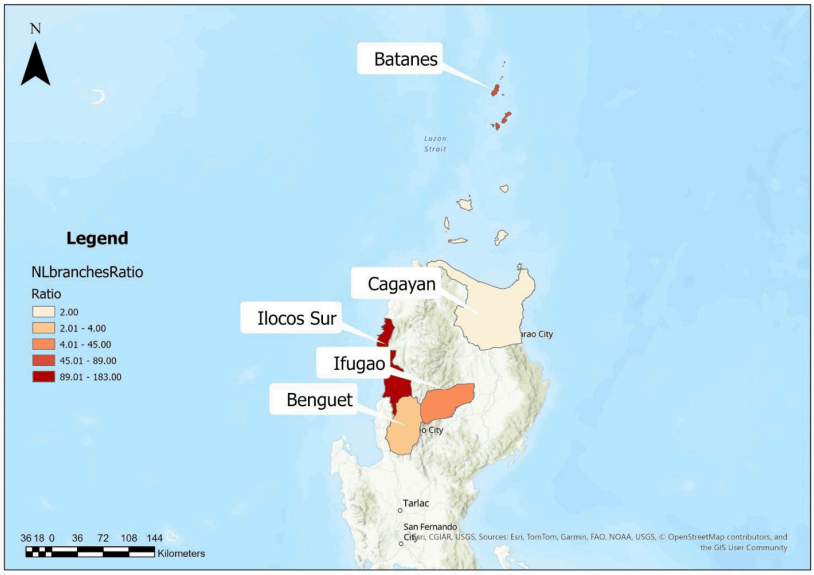

Figure 7. Note the visitor capture results in Northern Luzon.

History and sociology cross paths when we look at patterns that emerge when we compare individual component museum experiences within the same regions over a 6-year period. Line graphs of the five positively correlated NMP-RCMs indeed show shared fluctuation patterns as well as potential targets versus actual numbers (Fig 8, 9, 10, 11, 12). We begin to see a pattern that reflects societal changes that affect the nation or even the world, such as the recent experience of the global COVID-19 pandemic through the years 2019, 2020, and 2021.

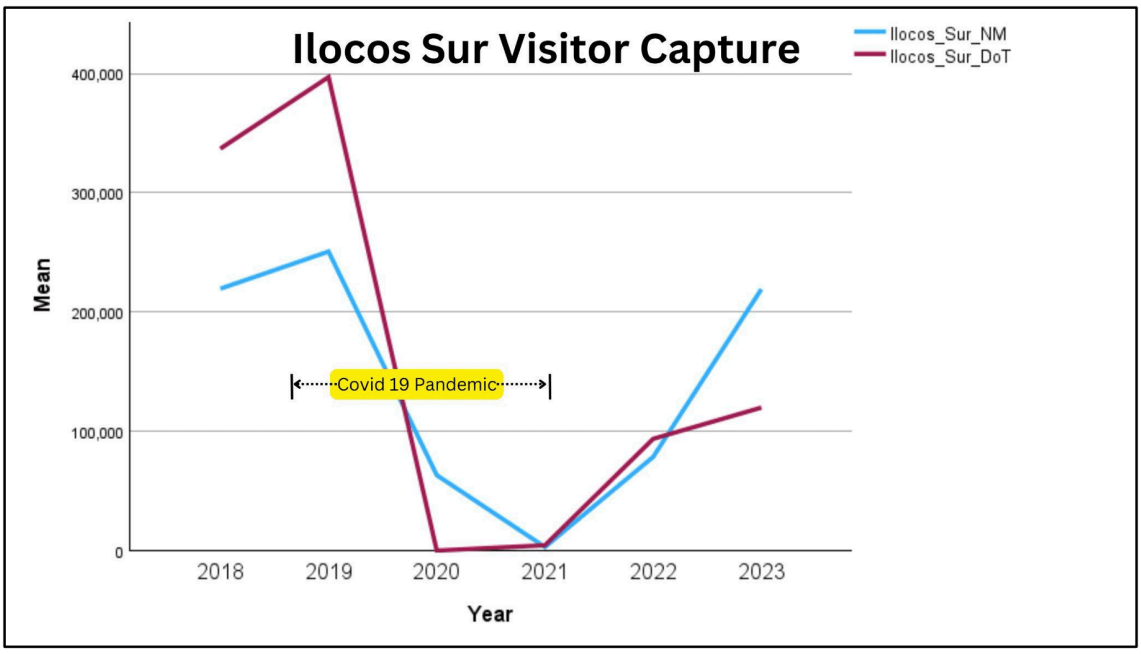

Figure 8. Visitor capture data NM Ilocos Sur 2018 to 2023

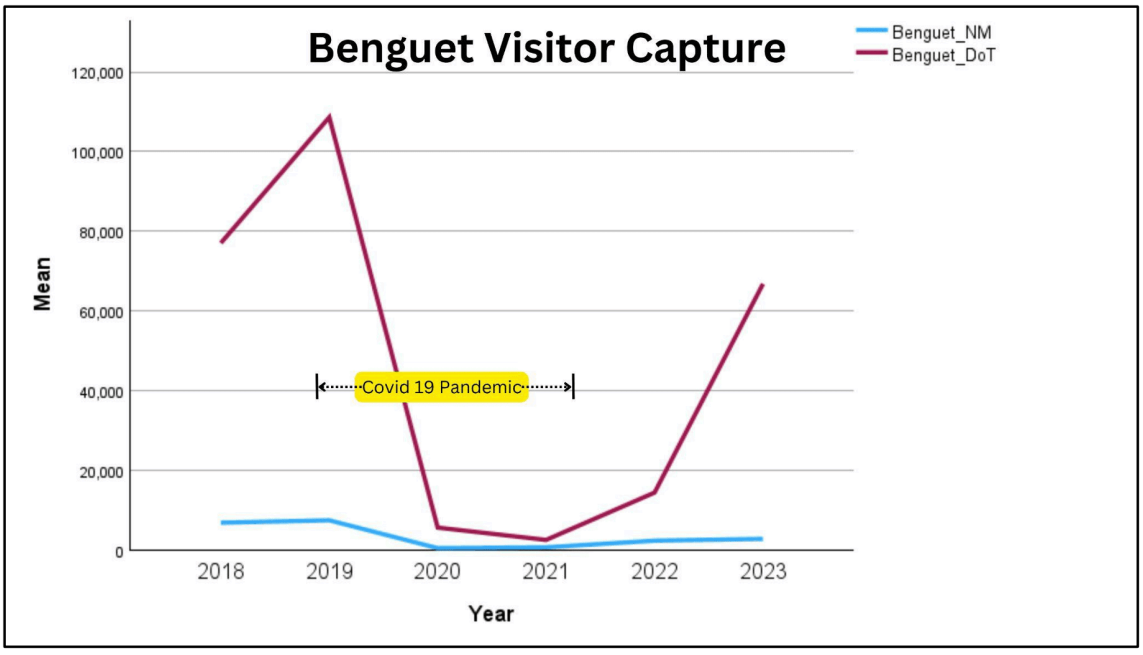

Figure 9. Visitor capture data NM Kabayan 2018 to 2023

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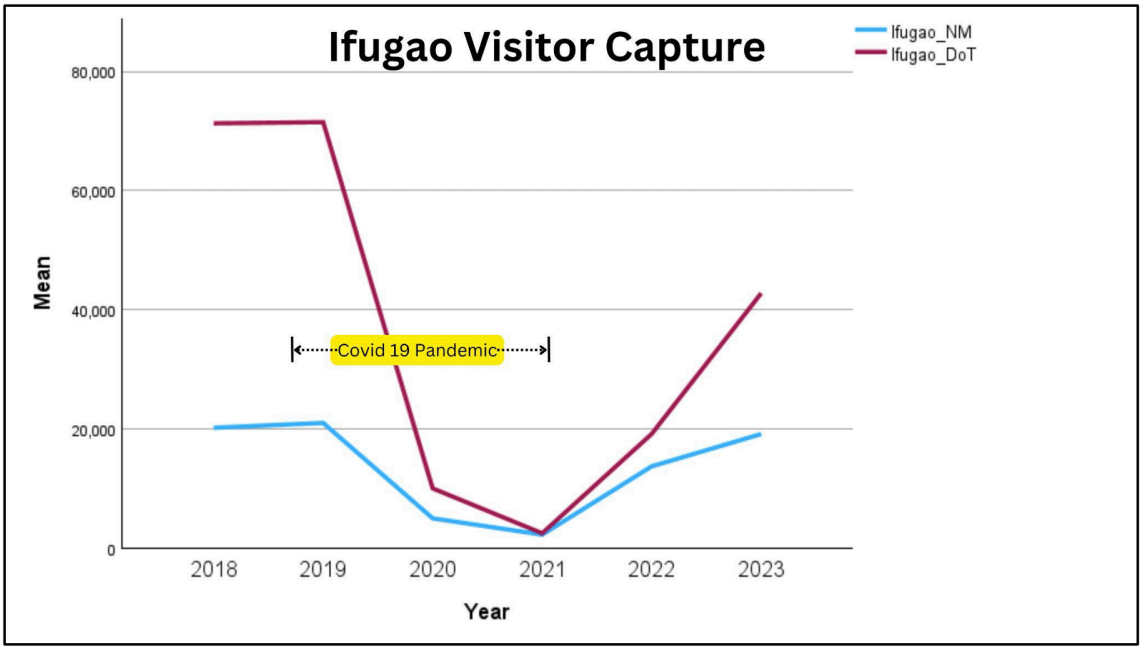

Figure 10. Visitor capture data NM Kiangan 2018 to 2023

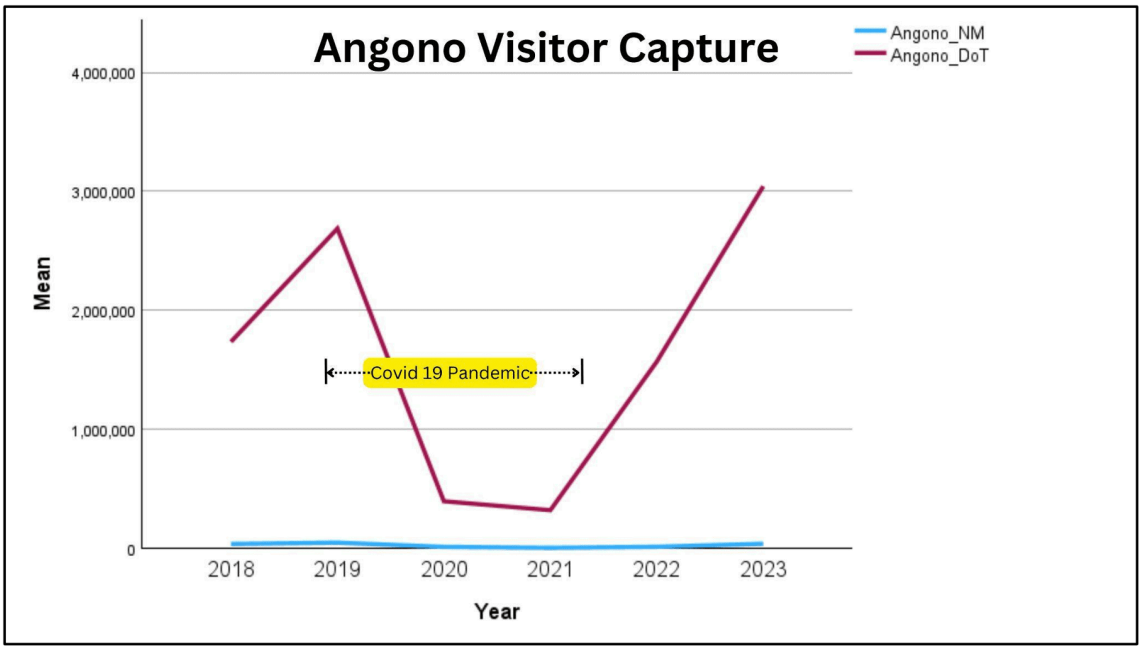

Figure 11. Visitor capture data NM Angono 2018 to 2023

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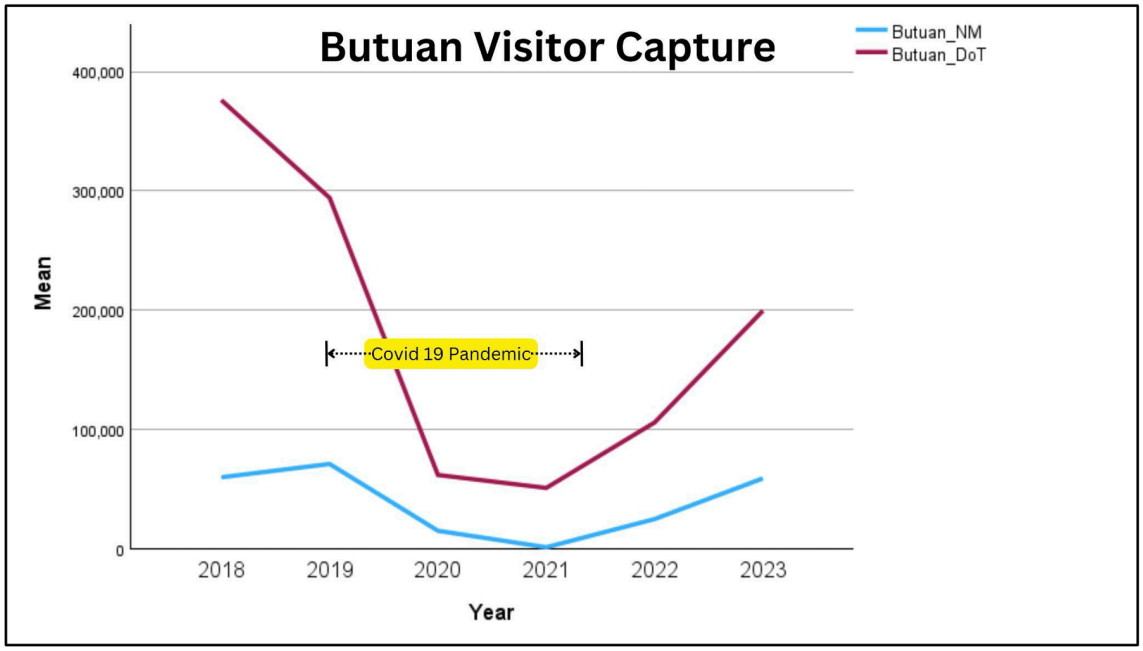

Figure 12. Visitor capture data NM Butuan 2018 to 2023

Limitations and Future Directions

This analysis was limited to ten (10) regional museums with continuous data between 2018 and 2023, which may restrict the generalizability of findings. Although strong correlations were observed, small sample size limits the statistical transparency and interpretability of results. Moreover, while a relationship between tourism arrivals and museum visits is suggested, this study does not establish causality. Future work should incorporate more comprehensive datasets, report full statistical outputs, and consider multivariate approaches to explore potential confounding variables.

This research note is an attempt to have a cursory appreciation of museum visitor statistics in the backdrop of a complex web of interactions of variables that ultimately affect tourism in the Philippines—a matter of social history. It is by no means conclusive but may be enhanced further by checkpoints in the future on the same dataset as well as an expanded dataset and even principal component analysis (PCA) on other possible variables.

Future research can also look at the highly variable carrying capacities of museum buildings, which may be affected by body heat indices, structural stability, age, as well as other factors.

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References

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2. ^*National Museum of the Philippines. Research Agenda 2028. Manila: National Museum of the Philippines.*

Declarations

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Potential competing interests: No potential competing interests to declare.