Evaluating The Effectiveness of Physical and Economic Management Strategies on the Sustainability of Tourist Attractions in Ol Pejeta Conservancy, Laikipia County, Kenya

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Abstract

Sustainability is an essential strategic concept for tourist attractions. However, the current rise in visitor numbers globally threatens this concept. This calls not only for the need to implement relevant visitor management strategies to oversee these numbers but also to ensure that the adopted strategies effectively facilitate proper visitor behaviour. Ol Pejeta Conservancy, Kenya, is a key tourist attraction that upholds sustainability as its strategic concept. However, the rise in visitor numbers over the past five years threatens the sustainability aspects of the site. Hence, using this site as a case study, this paper aims to assess the effectiveness of two major visitor management strategies - physical and economic - on the sustainability of tourist attractions. The study initially targeted 227 visitors, from whom 167 completed and returned the questionnaires. The collected data were analysed statistically using multiple linear regression. Results reveal that physical and economic management strategies play a crucial role in ensuring the sustainability of tourist attractions. Thus, they offer actionable insights to tourism managers in similar settings to implement effective strategies for sustainable efforts in tourist attractions.

Keywords: Sustainability, Visitor Management, Physical Strategies, Economic Strategies, Tourist Attractions

INTRODUCTION

Tourism is one of the fastest-growing industries in the global economy. This is evidenced by the rapid rise in international visitor arrivals from 25 million in 1950 to 1.5 billion in 2019, before the coronavirus pandemic (United Nations World Tourism Organization, 2020). Besides, the industry has shown its resilience after the pandemic by experiencing growth. In 2022, 66%, equivalent to 960 million international visitor arrivals, of the pre-pandemic levels were recovered (UNWTO, 2023). Its development accounts for the generation of one in ten jobs. This is equivalent to 330 million opportunities globally and USD 9.6 trillion in global domestic product (World Travel and Tourism Council, 2020).

Nevertheless, like any development, tourism has its downsides. These include vegetation loss, high crime rates, economic leakage, increased littering by visitors, and property vandalism (Cheung, 2013). These effects threaten the sustainability of tourism attractions, which focus on balancing environmental conservation, visitor satisfaction, local community well-being, and industry profits for the long term (Kişi, 2019).

Sustainability is a crucial concept that attraction managers need to observe. It ensures that the negative effects of tourism development do not outweigh its positive effects in the long term. (Sarhan et al., 2016) assert that attaining a balance between the aspects of sustainability in tourism attractions calls for a change in visitor behavior, which can be enhanced through visitor management strategies. These strategies aim to facilitate proper visitor behaviour, directing

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visitor flows, and increasing economic benefits in an attraction and visitor experience (Juma et al, 2020). Examples are site hardening and zoning as physical tools and charging fines and penalties as economic strategies (Qaddhat et al, 2021).

Globally, physical management approaches are among the most widely used tools for visitor management in tourism attractions (Leung et al., 2018). For instance, destination managers in the Mogao Caves, China, have set the physical capacity of visitors to 2 people per group for each cave to limit negative impacts (Demas et al, 2015). In Pilanesberg National Park, South Africa, roads and trails are commonly adopted as physical visitor management strategies. On the other hand, the use of differential entry fees based on age and residency encourages local visits even during off-peak seasons to attractions like Karura Forest, Kenya (Shah and Irandu, 2022).

Ol Pejeta Conservancy in Laikipia County, Kenya, stands out as a unique tourist attraction due to its role in promoting sustainability. It is home to the last two northern white rhinos in the world and is renowned for its innovative conservation efforts. It also supports visitor satisfaction through day and night game drives, lion tracking, bush camping, and bird walks. The conservancy empowers the adjacent local communities, including providing jobs and better education opportunities. To safeguard its sustainability efforts, the conservancy employs physical strategies like fencing and zoning, alongside economic strategies such as user fees. However, the rapid increase in visitor numbers poses a significant challenge. For instance, in 2022, Ol Pejeta recorded 163,000 visitor arrivals—49% more than in 2021—raising concerns about sustainability. Issues such as human-wildlife conflict, unemployment, and water shortages persist, underscoring the need to evaluate the effectiveness of its visitor management strategies.

It is undeniable that physical and economic management strategies have already been adopted in many destinations to ensure sustainability. Additionally, most studies outline various challenges facing the implementation of these approaches in tourism destinations, which may hinder their effectiveness. Nonetheless, little research has been done on the efficacy of these strategies in promoting sustainability efforts. Considering the expected rise in visitor numbers, the need to evaluate and monitor approaches that manage these numbers also rises. Regarding this, (Kebete & Wondirad, 2019) suggest the need for more research on the effectiveness of adopting visitor management strategies in ensuring the sustainability of tourism destinations. Therefore, this study aims to assess the effectiveness of physical and economic management strategies on the sustainability of tourist attractions.

LITERATURE REVIEW

Visitor management strategies are tools used to modify tourists' behavior, regulate visitor flow, provide visitor information, enhance visitor experience, and conserve resources (Eyassu et al, 2021; Qaddhat et al., 2021). Studies reveal that these strategies are obtained through the implementation of various approaches. The main documented approaches adopted and expounded in this research are physical and economic management strategies. Physical management strategies seek to limit negative impacts caused in resource-sensitive areas of a destination by controlling visitor flows. They achieve this purpose using physical interventions such as fencing sensitive areas to prevent visitor entry and setting platforms for wildlife viewing, site hardening, zoning, and establishing carrying capacity practices (Enseñat-Soberanis et al, 2019; Qadhat et al., 2021). On the other hand, economic management strategies employ prices to regulate visitor behavior, where they can be imposed as either incentives or disincentives (Qaddhat et al., 2020). Price incentives encourage visitors' behaviour, thus acting accordingly towards minimizing resource impacts, while price disincentives focus on discouraging inappropriate visitor behaviour.

Physical and economic management strategies play a crucial role in ensuring sustainability. Sustainability in tourism aims to ensure that the current and future impacts of tourism development address the needs of visitors, the industry, the environment, and the host communities (Leung et al., 2018; Panic et.al, 2019). The VICE model further explains sustainability by highlighting the interdependence of the visitors and the industry that attends them (tour operators, accommodation sectors). Further, it explains the community that hosts them and the environment where it takes place (Wawire et.al, 2023). The sustainability of visitor aspects is identifiable through visitor satisfaction and experiences. Further, industry sustainability is measured based on the profits accrued and the occupancy rate. Factors such as the number of social services attributed to tourism available to locals, the level of local satisfaction with tourism, and the ratio of tourists to locals demonstrate the host community's sustainability (Asmelash & Kumar, 2019). Lastly, environmental sustainability is identifiable through the level of environmental resource conservation.

Globally, physical and economic management strategies are widely implemented to ensure the sustainability of destination attractions. In Kakadu Park, Australia, (Mason, 2020) describes that the attraction

site upholds conservation while supporting visitor experiences using zoning and limiting access to minimize wildlife disturbances and protect the indigenous culture. Elsewhere, in Everglades National Park, USA, the site managers enforce differential user fees to encourage eco-friendly transportation, with pedestrians and cyclists paying lower fees than private car owners (Leung et al., 2018). Besides, the Mogao Caves authorities in China limit group sizes to two people per cave to prevent the deterioration of ancient rock art (Demas et al., 2015). In Hustai National Park, Mongolia, charging user fees is a visitor management strategy that provides conservation revenue for Przewalski's wild horses (Leung et al., 2018).

Africa is rich in natural and cultural resources, which attract many visitors annually, generating revenue for conservation and local economies (Murungi, 2020). However, (Ireri et al., 2020) note that most local communities are still poor despite being adjacent to destinations rich in tourism resources. A study in Ethiopia also reveals that inadequate implementation of waste management practices, zoning, and carrying capacity practices threatens sustainability in tourist attractions (Kebete & Wondirad, 2019). In addition, (El-Barmelgy, 2013) asserts that despite Egypt possessing some natural, cultural, and historic sites, visitor mismanagement has rendered most of its attractions unsustainable. Nevertheless, attraction sites like Volcanoes National Park in Rwanda limit visitor numbers through an annual cap of 20000 permits. Thus, the management charges fees according to demand (Spenceley, 2014). This strategy promotes sustainability efforts by providing finances for conservation and local community incentives, which in turn value the park's resources and work towards protecting them.

Tourism in Kenya is a major economic driver, contributing to 10.4% of GDP and 5.5% of formal employment (Tourism Research Institute, 2023). In 2022, visitor arrivals increased by 70.45%, approximately 1.5 million visitors (Tourism Research Institute, 2023). This growth has encouraged the implementation of better visitor management strategies in various attractions. The Amboseli Ecosystem upholds zonation programs to manage visitor behaviour while directing activities, thus limiting resource destruction (KWCA, 2016). Besides, Kenya Wildlife Service (2021) outlines strategies, including the availability of trails and viewpoints, that are adopted in Nairobi National Park to oversee visitor behaviour. In Karura forest, the management uses differential charging of entry fees, with residents paying cheaper than non-residents (Shah & Irandu, 2022). It has ensured revenue generation for conservation from local visits even during off-peak seasons. Nonetheless, challenges like weak stakeholder collaboration and inadequate monitoring, evaluation, and resources hinder the effectiveness of these strategies (Juma et al., 2020).

Physical and economic visitor management strategies enhance sustainability, but their effectiveness varies by region. Global practices offer insights into strategic implementation, yet African destinations, including Kenya, face structural challenges that affect the success of these approaches. Given the expected rise in visitor numbers to 1.8 billion by 2030 (Bak & Szczecinska, 2020), there is an urgent need for continuous evaluation and improvement of these strategies to ensure long-term sustainability.

METHODS
Research Context
The study was conducted in Ol Pejeta Conservancy, which is one of the most visited tourist attractions within Laikipia County, Kenya. The conservancy offers a wide variety of tourist attractions, which include a high abundance of wildlife, including 'the big five,' a chimpanzee sanctuary, black rhinos, and the rarest species of northern white rhinos in the world. This attraction embraces management strategies such as fencing, zoning, education, and tour guides. Besides, it supports major sustainability efforts like local community empowerment and wildlife conservation. Henceforth, it was used as the case study in this research due to its rise in demand and, hence, the need to ensure that the visitor management measures adopted facilitate efficacy in attaining sustainability.

Research Design and Data Collection
The study adopted a descriptive research design using semi-structured questionnaires to collect quantitative data from a target population of 3000 visitors. The sample size of 227 visitors was determined using the (Krejcie and Morgan, 1970) model, as shown below.

$$s = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

Whereby;

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.814)

N = the population size (3000)

P = the population proportion that has the desired characteristics (calculated to be 0.80 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (0.05)

Hence, the sample size was;

$$\frac{1.96^2 \times 3000 \times 0.8(1-0.8)}{0.05^2 \times (3000-1) + 1.96^2 \times 0.8(1-0.8)} = 227$$

Questionnaires contained mainly closed-ended questions in the form of a five-point Likert scale. Systematic random sampling was used to select the visitors. This is because it eliminates bias by ensuring that each respondent has an equal chance of being selected. The first visitor respondent was randomly selected from the main entrance of the conservancy (Rongai gate). Then, the subsequent units of every 18th visitor respondent were selected until the total sample was achieved. The data collected was organized and coded using MS. Excel. It was then imported into the Statistical Package of Social Sciences (SPSS) version 28 for analysis. Demographic characteristics of the respondents were determined using frequencies, while descriptive analysis was conducted using frequencies and means. Multiple linear regression was used for inferential statistics to test relationships between variables at a significance level of $p < 0.05$.

The variables were subjected to various diagnostic tests to ascertain whether the collected data fit regression modelling. The Shapiro-Wilk test was used to assess the normality of responses, while the linearity test was conducted to determine whether the relationship between physical and economic management strategies and the sustainability of tourist attractions deviates from a linear relationship. Additionally, the homoscedasticity test was established using Levene's test. The test aimed to measure whether the variation of responses on the effectiveness of physical and economic strategies on the sustainability of tourist attractions is the same for different predictor variables. The multicollinearity test was also assessed to determine whether there is a correlation between the study variables using Tolerance values and Variance Inflation Factors (VIF). Eventually, the results were presented in tables and graphs.

RESULTS AND DISCUSSION

Response Rate

The study had a sample size of 227 visitors. Out of the 227 questionnaires distributed to visitors, 167 were completed and returned. This amounted to a 74% response rate. According to (Mugenda & Mugenda, 2012), a response rate of 70% is suitable for investigation and reporting. Thus, this response rate was considered appropriate for the study.

Demographic Characteristics

The study assessed various demographic characteristics for visitors, including nationality, age, purpose of the visit, frequency of visit, and length of stay. The results, as shown in Figure 1, indicated that the highest percentage of visitors was Kenyans (80.4%), followed by those from Europe (10.8%). The visitors of American nationality were 7.2% and 1.8% visited from Uganda. Results also revealed that 62.3% of the respondents were males, while 37.7% were females. The findings also demonstrated that the majority of these respondents were aged 26-35 years (58.7%), followed by those aged 36-45 years (21.0%), implying that most visitors to the conservancy were young people. Only a fifth of the respondents were aged above 46 years. Figure 1 also showed that the majority of the respondents (41.3%) were attracted to Ol Pejeta Conservancy due to their interest in conservation activities. This highlights Ol Pejeta Conservancy as a major conservation destination, making it an appropriate choice for the study. Wildlife contributed to 26.4% of the respondents' visits, while community interest attracted 21.0% of the respondents. Time with family and other purposes like leisure and relaxation had low attraction rates of 6.7% and 4.8% respectively.

Moreover, Figure 1 shows that the frequency of visits to Ol Pejeta Conservancy by the respondents was mainly by first-time travellers at 65.9% while 34.1% had visited regularly. Regarding the choice of accommodation, Figure 1 illustrates that the highest number of respondents who stayed overnight chose lodges, representing 36.5%, while 35.3% stayed in tented camps. However, 28.2 % of the respondents did not stay overnight. The majority of the respondents (46.1%) stayed within the conservancy for 1-5 days, while 31.1% stayed for 1 month. Respondents who registered the lowest length of stay (22.8%) spent 1-3 weeks at the attraction.
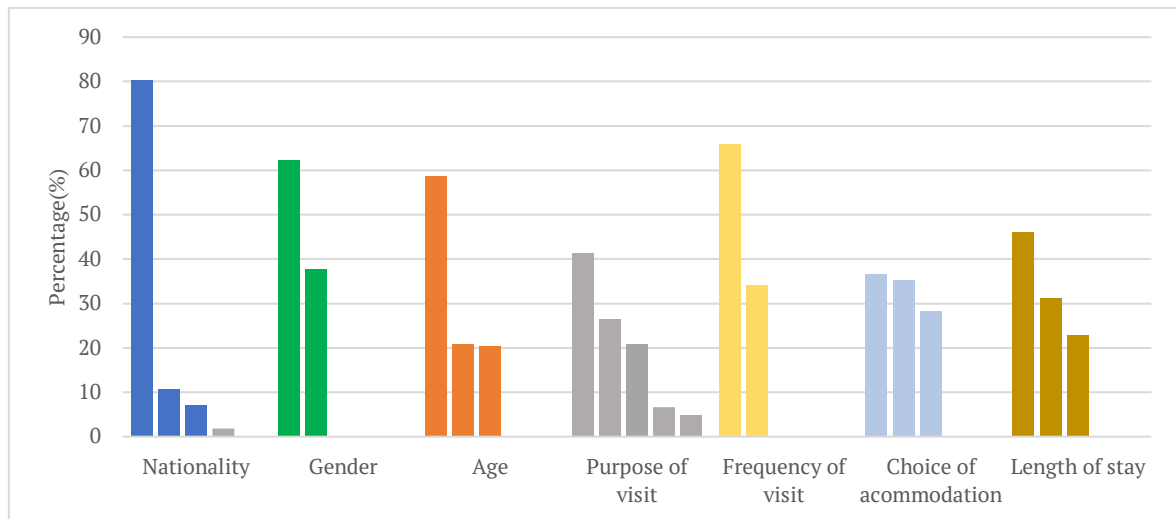
Figure 1. Demographic Characteristics for Visitors
Source: Research data, 2025

### Availability of Physical and Economic Management Strategies

The study examined visitors' responses to the availability of physical management strategies. The measures used included the availability of zones, walking and cycling trails, set group size limits, toilets, and garbage bin facilities. Results illustrated that 66.5% of the respondents agreed with the availability of various zones within the attraction site, 19.8% were neutral, and 13.8% disagreed with the availability of zones in the site. Regarding the availability of walking and cycling trails, 71.2% of the respondents agreed that the trails were available, 7.8% disagreed, and 21.0% remained neutral. Respondents who agreed that a set group size limit was available included 57.4%, 15.0% disagreed, while 27.5% remained neutral. The highest percentage of the respondents (77.2%) were in agreement that there were garbage bins placed strategically within the attraction site.

On the other hand, 10% disagreed with the availability of garbage bins, while 12.6% remained neutral. Results of the study also indicated that toilet facilities were available at the attraction site, based on the 87.4% agreement from the respondents. However, 4.2% of the respondents disagreed with the availability of toilet facilities, and 8.4% remained neutral. The questionnaire items were also used to measure the availability of economic strategies, including differential entry fees, fines and penalties, parking fees, and price discrimination. Results revealed that 76.6% of the respondents agreed that differential pricing on entry fees based on the nationality and age of visitors was applied in the conservancy. However, 12.0% disagreed with the availability of this strategy, while 11.4% remained neutral. Inappropriate behaviour was found to be subject to fines and penalties, according to 62.2% of respondents who agreed with the statement. The findings also showed that 25.1% of the respondents neither agreed nor disagreed with the availability of fines and penalties for inappropriate behaviour, while 12.6% disagreed. Parking fee was charged according to 49.1% of the respondents who agreed with the statement. A moderate response of 39.5% remained neutral about the availability of parking fees, while 11.4% disagreed. Results indicated that there were charges for engaging in conservation experiences within the conservancy, with 48.5% of respondents agreeing with the statement. Nevertheless, 24.0% of the respondents disagreed with the availability of this strategy, indicating that they engaged in free-entry conservation experiences, while 27.5% remained neutral.

Sustainability Aspects in Ol Pejeta Conservancy

This study sought to assess the achievement of sustainability aspects regarding visitor management strategies adopted in Ol Pejeta Conservancy. Results in Figure 2 demonstrate that 74.2% of the respondents agreed there was less vegetation loss, bare ground, and washed away soils. On the other hand, 21.0% of the respondents remained neutral to the statement, while 4.2% disagreed. 88.6% of the respondents agreed that wildlife was in a well-fenced area, 8.4% stayed neutral, and only 3.0% disagreed with the statement. Results reveal that 84.4% of the respondents found the environment clean, 11.4% were undecided, and 4.2% disagreed. Noise levels in the conservancy were found to be acceptable by the majority of the respondents (66.4%), depicting positive outcomes in the adoption of visitor management strategies. However, a considerable number of respondents, represented by 27.5%, neither agreed nor disagreed with the noise levels, while 6.0% disagreed with the acceptability of the noise levels.

Regarding crowding levels, 62.8% of respondents agreed that they were acceptable. Nevertheless, 8.4% of the respondents disagreed with the acceptability of crowding levels, while 28.7% stayed neutral. The highest percentage of respondents (76.6%) agreed that they had a good experience interacting with the local people, while 17.4% disagreed. Only 6.0% stayed neutral about the statement. Results showed that 60.4% of respondents agreed that souvenirs and crafts were available in the conservancy. Nonetheless, 25.7% remained neutral to the response while 13.8% disagreed (Figure 2).
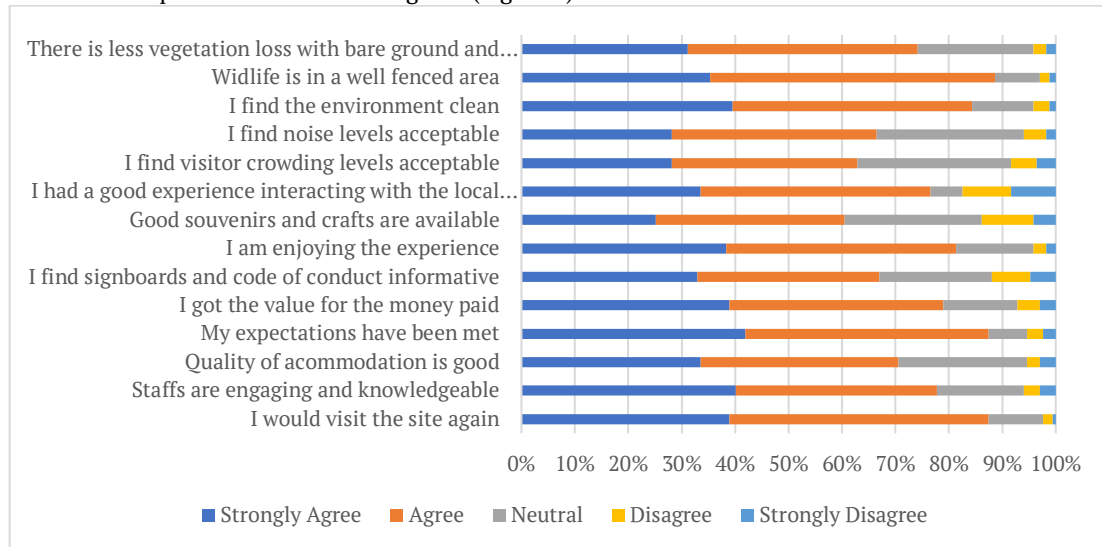
Figure 2. Measures of Sustainability Aspects in Ol Pejeta Conservancy
Source: Research data, 2025

The codes of conduct were informative according to 67.0% of the respondents, symbolizing that implementation was significant. However, 12.0% of the respondents did not find them informative, while 21.0% remained neutral to the statement. The study results indicated that 81.4% of the respondents agreed that they were enjoying their experience in the conservancy, 14.4% were undecided, and 4.2% disagreed. The study results also reveal that 78% also agreed that they got the value for their money, 7.2% disagreed with the statement, and 13.8% stayed neutral to the response. Moreover, 87.4% of respondents agreed that their expectations had been met, 7.2% remained neutral, and 6.4% disagreed. The element of visitor satisfaction was further shown in the statement on the quality of accommodation, where 70.6% of the respondents agreed that it was good, 24.0% remained neutral to the statement, and only 6.0% disagreed. Figure 2 illustrates that 77.8% of the respondents agreed that staff were engaging and knowledgeable, 16.2% remained neutral, and 6.0% disagreed. In the final statement on the questionnaire, the visitors were asked if they would visit the conservancy again, where the highest number (87.4%) agreed, 10.2% stayed neutral, and 2.4% disagreed with the statement.

Tests for Model Fitness

This study employed multiple linear regression analysis to assess the direct effects of the study variables on the sustainability of tourist attractions. Therefore, to establish whether the data collected was fit for regression modeling, diagnostic tests (i.e., normality test, linearity test, homoscedasticity test, and multicollinearity test) were first carried out. The Shapiro-Wilk test was used to assess the normality of responses. Results showed that the physical management strategies had a p-value of 0.43 > 0.05 and economic strategies had a p-value of 0.65 > 0.05. Sustainability variables had a significant score of 0.18, which is greater than 0.05. Therefore, all the variables had a p-value greater than 0.05, suggesting that the data were normally distributed and multiple linear regression could be used for the study.

Results in the linearity test indicated that the p-values for the deviation from linearity, for all independent variables, were above the conventional threshold of 0.05. Therefore, there was no significant evidence to suggest a deviation from linearity for any of these strategies, indicating that a linear relationship existed between the independent variables and the dependent variable. Levene's test for equality of variances was conducted to assess whether the assumption of homogeneity of variances was met when examining their impact on the sustainability of tourist attractions. Results showed that p-values for the physical and economic strategies were 1.11 and 0.08, respectively, confirming that the homogeneity of variances assumption holds for regression analysis. Multicollinearity was assessed in the regression model using variance inflation factors

(VIF) and tolerance values. Results indicated that physical strategies had a high tolerance value of 0.94 and a VIF value of 1.06, while economic strategies had a tolerance value of 0.87 and a VIF value of 1.16. Thus, they demonstrated that all independent variables were within acceptable limits (tolerance > 0.10 and VIF < 10). This demonstrated that variables in the model do not exhibit problematic levels of multicollinearity, and therefore, were fit for regression analysis.

Physical Management Strategies and Sustainability of Tourist Attractions

Furthermore, the study examined the relationships between various management strategy predictors and sustainability. Particularly, the relationship between physical management strategies and the sustainability of tourist attractions was tested. Results from Table 2 outlined that regression coefficients for the specific predictor variable scores of physical strategies were as follows: several zones, e.g., for leisure activities, wildlife conservation, and camping in the site, had a beta value of 0.088, standard error of 0.030, and p-value of 0.314. Results on walking and cycling trails showed that the variable had a beta value of 0.295, a standard error of 0.026, and a p-value of 0.001. Besides, set group size limits had a beta of 0.216, a standard error of 0.025, and a p-value was 0.004; toilet facilities had a beta value of 0.100, a standard error of 0.032, and p of 0.250, while garbage bins results revealed that the beta value was -0.069, standard error 0.033, and p = 0.436. out of the measured predictors, walking and cycling trails, set group size limits, and toilet facilities were found to be significant at a 95% confidence level.

Table 1. Multiple Regression Coefficients

Physical management strategies	β	S.E.	Beta	t-value	Sig.
There are several zones, e.g., for leisure activities, wildlife conservation	0.030	0.030	0.088	1.009	0.314
Walking and cycling trails are available	0.106	0.026	0.295	4.098	0.001
Garbage bins are placed strategically within the site	-0.026	0.033	-0.069	-0.780	0.436
Toilet facilities are available	0.037	0.032	0.100	1.155	0.250
There is a set group size limit	0.072	0.025	0.216	2.909	0.004

Dependent Variable: Sustainability

Source: Research data, 2025

Economic Management Strategies and Sustainability of Tourist Attractions

Results in Table 2 demonstrated that the regression coefficients for the specific economic strategy predictor variable scores were as follows: differential entry fee based on age and nationality had a beta value of -0.078, standard error of 0.044, and a p-value of 0.325. The findings also showed that fines and penalties for inappropriate behavior had a Beta value of -0.066, a standard error of 0.022, and a p of 0.398. The parking fee had a beta value of 0.039, a standard error of 0.028, and a p-value was 0.638. Charges for engaging in conservation experiences values included beta as 0.369, standard error of 0.022, and p as 0.001. Among the tested predictors, only charging fees for conservation experiences was significant at a 95% confidence level.

Table 2. Multiple Regression Coefficients

Economic management strategies	β	S.E.	Beta	t-value	Sig.
There is a differential entry fee based on age and nationality	-0.043	0.044	-0.078	-0.987	0.325
Fines and penalties are charged for inappropriate behaviour	-0.047	0.022	-0.066	-0.847	0.398
Parking fee is charged	0.013	0.028	0.039	0.471	0.638
There are charges for engaging in conservation experiences	0.113	0.022	0.369	5.064	0.001

Dependent Variable: Sustainability

Source: Research data, 2025

Hypothesis Testing

The results for testing hypotheses are given in three parts, which include model summary, ANOVA results, and regression coefficients. The model summary obtained values that explained the overall effect of the independent variables on the dependent variable. Results in Table 3, on the effectiveness of physical and economic management strategies and the sustainability of tourism attractions in Ol Pejeta Conservancy, indicated that the model summary scores were as follows: (R^2=0.520, Adjusted R^2 = 0.514, Std. Error=2.140, F= 88.833, $p < 0.001$). The second part of the multiple regression analysis was the ANOVA results. In regression analysis, the ANOVA results assess the significance of the obtained model in describing the collected data. Results in Table 3 demonstrated a p-value of 0.001. Thus, it was less than 0.05, implying that the multiple regression model was significant and correctly fitted the data description.

Table 3. Model Summary and ANOVA Results

Model Summary					
R	R²	Adjusted R²	Std. Error	F	Sig.
0.721	0.520	0.514	2.140	88.833	0.001
ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	12.521	4	6.260	88.833	0.001
Residual	11.557	162	0.070		
Total	24.078	166			

Dependent variable: Sustainability of tourist attractions
Predictors: (Constant), Physical strategies, Economic strategies

Source: Research data, 2025

Furthermore, Table 4 outlines the regression coefficients for each independent variable along with their standard errors, t-statistics, and p-values. These p-values were used to assess the significance of each predictor's impact on the dependent variables and to test the study hypotheses. For the specific independent variables, scores were as follows: physical strategies (Beta = 0.279, S.E. = 0.043, p = 0.001) and economic strategies (Beta = 0.190, S.E. = 0.049, p = 0.011). Therefore, in testing H01, that is, there is no significant relationship between physical management strategies and the sustainability of tourism attractions in Ol Pejeta Conservancy, Laikipia County, the p-value for physical management strategies, which was statistically significant at 0.001, was used. This was in line with the standard error of 0.043, t-statistic of 3.758, and a positive regression coefficient value of 0.163, as shown in Table 4. Thus, with the p-value less than 0.05, the null hypothesis H01 was rejected. Moreover, in testing H02, that is, there is no significant relationship between economic management strategies and the sustainability of tourism attractions in Ol Pejeta Conservancy, Laikipia County, the p-value for economic management strategies, which was statistically significant at 0.011, was used. This was in line with the standard error of 0.049, t-statistic of 2.561, and a positive regression coefficient value of 0.125, as shown in Table 4. Therefore, since the p-value is less than 0.05, the null hypothesis H02 was rejected.

Table 4. Multiple Regression Coefficients

Visitor management strategies	β	S.E.	Beta	t-value	Sig.
Physical strategies	0.163	0.043	0.279	3.758	0.001
Economic strategies	0.125	0.049	0.190	2.561	0.011

Dependent Variable: Sustainability

Source: Research data, 2025

Discussion

Results indicated that zones, toilet facilities, garbage bins, trails, and set group size limits were implemented in the conservancy. These findings agree with (Kebete and Wondirad, 2019), who highlight physical management approaches as some of the most utilized tools for visitor management in tourism attractions. The findings also support their role in ensuring sustainability within the conservancy. Particularly, they reveal that there is less vegetation loss, hence promoting environmental sustainability through strategies like the availability of trails that reduce vegetation trampling. Implementation of zoning also ensures that wildlife is in a well-fenced area. This signifies proper conservation and reduction of issues such as human-wildlife conflict (Bartula & Radun, 2020). The environment was also clean, which endorses the relevance of adopting toilet and garbage bin facilities in the conservancy. These facilities ensure proper waste management, thus reducing pollution that could affect the site resources and the adjacent communities (Leung et al., 2018). The results also reveal the relevance of set group size limits in promoting acceptable crowding levels within the conservancy and the proper ratio of locals to tourists among the communities. Thus, they align with (Albrecht, 2017), who presents crowding levels as a carrying capacity issue, which ensures visitor experiences, positive local attitude, and conservation if acceptable in destinations.

Moreover, the results shed light on the relationship between physical management strategies and the sustainability of tourist attractions. For instance, visitor responses ascertain that walking and cycling trails effectively ensure sustainability in Ol Pejeta Conservancy. These results agree with (Mason, 2020), who asserts that using trails in attraction sites reduces the impact of visitors' activities such as walking and cycling, enabling better resource conservation and visitor satisfaction. Besides, the findings show that the availability of set group size limits in Ol Pejeta Conservancy ensures that the number of visitors to a destination is at a sustainable level. These findings align with (Spenceley et al., 2015), who establish that group size limits reduce

environmental degradation, deterioration of social culture and economic aspects in local communities, and user dissatisfaction levels.

Regarding economic strategies, results indicate that differential entry fees based on nationality, parking fees, fines, penalties, and charges for conservation experiences are available in Ol Pejeta Conservancy. The results align with the Ol Pejeta Tariff Guide, which outlines the entry fee based on whether a visitor is an East African citizen, East African resident, or non-resident. Moreover, prices differ between adults and children (Ol Pejeta Conservancy, 2024). Some additional fees described in the tariff guide include charges for armed and unarmed guides, various conservation experiences, and accommodation. The relevance of these strategies in ensuring sustainability is depicted in the results. For instance, based on these findings, wildlife is in a well-fenced area, and the environment was found clean, demonstrating the availability of proper infrastructure to attain these initiatives. The findings reveal that out of four economic management strategies tested in Ol Pejeta Conservancy, only the availability of charges for engaging in conservation experiences was significant. This portrays the importance of the strategy in ensuring sustainability. The results endorse Spenceley et al. (2015), who pointed out that charging fees for visitor activities provides income for conservation initiatives and revenue generation within the local community. Henceforth, it facilitates the achievement of aspects of sustainability, such as community well-being, industry profits, and conservation.

On the other hand, the results reveal that the availability of differential fees based on age and nationality is insignificant, showing that it is inefficient in ensuring sustainability. The results agree with (Kebete and Wondirad, 2019), who highlight differential fees as a common strategy employed in many attractions in developing countries as merely a method of revenue generation, but not visitor management. Similarly, the findings show that charging fines and penalties and the availability of parking fees are insignificant and, hence, ineffective in attaining sustainability in Ol Pejeta Conservancy.

Policy Implications

The study reveals that physical management strategies have varying effectiveness in promoting sustainability. Henceforth, to ensure their continued benefits, trails, zones, and infrastructural facilities should be expanded and regularly maintained. Setting group size limits enhances conservation and visitor satisfaction. Therefore, destination managers and policymakers should monitor compliance with the enforced limits to improve their efficacy. Most of the economic strategies tested in this study had little impact on sustainability. This calls for the need to revise and possibly incorporate new pricing models that align better with sustainability objectives. Managers in tourist attractions should implement education programs to inform visitors of the relevance of enforcing some of these strategies. It can improve compliance, yielding better sustainability results. Local community empowerment is a crucial sustainable aspect, as shown in this study. Thus, policymakers should establish platforms for community involvement in strategy enforcement and benefit sharing. This can foster a positive attitude towards tourism and conservation. Implementing physical and economic strategies may not be enough. Site managers should also evaluate them regularly through visitor feedback and environmental impact assessments. As such, they can identify areas of adjustment and correction, thus maximizing their effectiveness in ensuring sustainability.

CONCLUSION

The study illuminates that implementing physical and economic management practices to oversee visitor behaviour is crucial in promoting sustainable practices in Ol Pejeta Conservancy. This offers actionable insights to tourism managers in similar settings to implement effective strategies for sustainable efforts in tourist attractions. Moreover, the study emphasizes the efficacy of specific strategies like walking and cycling trails, setting group size limits, and charging for conservation experiences, implying their importance in achieving sustainability. It also contributes to sustainable tourism management literature by providing empirical evidence on the varying effectiveness of visitor management strategies, highlighting areas that require policy revision.

Therefore, the study concludes that tourist attractions implement diverse visitor management strategies to promote sustainability efforts. Nevertheless, unlike other studies, the study further establishes whether the relationship between the adopted strategies and sustainability is effective. It sums up that the effectiveness of different management strategies in promoting the sustainability of tourist attractions varies. For instance, physical management strategies, including trails and group size limits, significantly support sustainability goals by mitigating environmental impacts and managing visitor flow in Ol Pejeta Conservancy.

Economic strategies contribute significantly to sustainability through conservation experience charges but are less impactful through differential fees, fines, and parking charges. However, the study was geographically

limited to Ol Pejeta Conservancy; hence, the results could not be generalized to other tourist attractions with different ecological, economic, or cultural settings. Besides, this study did not assess the long-term impact of physical and economic management strategies on sustainability, which are prone to change due to fluctuations in visitor numbers. Thus, the study calls for future comparative research on the effectiveness of physical and economic management strategies across different tourist attractions, such as natural reserves and cultural sites. This could help identify specific patterns in strategies that are more effective while revealing those that need re-evaluation across various attraction sites. It also recommends that further research be conducted as a longitudinal study to examine the effectiveness of physical and economic strategies on sustainability in the long term.

ACKNOWLEDGMENTS

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