Residents' preferences for tourism development in a protected area: a choice experiment

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Abstract

Purpose – This study aims to reveal residents' individual perceptions of nature-based destination development and preferences for infrastructure and tourism superstructure development among communities that rely heavily on wildlife tourism.

Design/methodology/approach – A discrete choice experiment (DCE) was used among the Maasai community based in the villages and towns near the Maasai Mara National Reserve in Kenya. The attributes included type of tourism accommodation, location of tourism accommodations, types of access roads (tarmac or marram), tourist numbers and desired land-use options (between tourism development, livestock grazing and agriculture). A DCE analysis with hierarchical Bayes estimation was performed.

Findings – It revealed that the introduction to land-use restrictions and the location of tourism accommodations were the most important attributes for the respondents, with average importance values of 30.36% and 24.02%, respectively. A significant less important attribute was the types of access roads with an average importance of just 8.38%. Cluster analysis revealed widespread heterogeneity in preferences.

Research limitations/implications – The survey-based DCE was conducted in the Maasai Mara National Reserve, Kenya, and therefore may not be relevant in other contexts. The focus was also only on the residents' preferences. The findings broaden the knowledge on tourism developments and residents' support for development and management of protected areas.

Practical implications – For policymakers, conservation practitioners and tourism businesses, this study provides a source of reference for understanding the development preferences of the Maasai community. In general, the study contributes to a better understanding of local communities in relations to tourism development and residents' support for developments and management of protected areas (PAs).

Originality/value – This study fills the gap in the literature on tourism development and residents' support for developments in PAs by presenting some limits of acceptable and desirable use of PAs among a community that has a complex coexistence with a wildlife tourism destination. It provides an alternative perspective for future research by examining residents' choice towards destination development and preferences for infrastructure and tourism superstructure development using an experimental approach.

Keywords Protected areas, Residents' perception, Development, Preferences, Choice-based conjoint, k-mean clustering

Paper type Research paper

保护区内居民对旅游开发的偏好：选择实验

摘要

目的： 本研究旨在揭示当地人对基于自然的目的地开发的个人看法以及严重依赖野生动物旅游的社区对基础设施和旅游上层建筑开发的偏好。

方法： 离散选择实验（DCE）在肯尼亚马赛马拉国家保护区附近村庄和城镇的马赛社区中进行。这些属性包括旅游住宿类型、旅游住宿地点、通路类型（停机坪或马拉姆）、游客数量以及所需的土地利用选择（在旅游开发、牲畜放牧和农业之间）。使用分层贝叶斯估计进行 DCE 分析。

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发现：结果显示，土地使用限制和旅游住宿地点是受访者最重要的属性，平均重要性值分别为30.36%和24.02%。一个不太重要的属性是通路类型，平均重要性仅为 8.38%。聚类分析揭示了偏好的广泛异质性。

影响：对于政策制定者、保护从业者和旅游企业来说，这项研究为了解马赛社区的发展偏好提供了参考来源。总的来说，该研究有助于更好地了解当地社区与旅游业发展的关系以及居民对保护区开发和管理的支持。

原创性/价值：这项研究通过提出在与野生动物旅游目的地复杂共存的社区中可接受和理想的保护区使用的一些限制，填补了关于旅游发展和居民对保护区发展的支持的文献空白。它通过使用实验方法研究当地人对目的地开发的选择以及对基础设施和旅游上层建筑开发的偏好，为未来的研究提供了另一种视角。

关键词 保护区，居民感知，发展，偏好，基于选择的联合，*k*均值聚类。

文章类型 研究型论文

Preferencias de los residentes por el desarrollo turístico en una zona protegida: Un experimento de elección

Resumen

Objetivo: *Este estudio pretende revelar las percepciones individuales de los residentes sobre el desarrollo de destinos basados en la naturaleza y sus preferencias por el desarrollo de infraestructuras y superestructuras turísticas entre las comunidades que dependen en gran medida del turismo de fauna salvaje.*

Metodología: *Se empleó un experimento de elección discreta (DCE en inglés) entre la comunidad masai asentada en las aldeas y pueblos cercanos a la Reserva Nacional de Maasai Mara en Kenia. Los atributos incluían el tipo de alojamiento turístico, la ubicación de los alojamientos turísticos, los tipos de carreteras de acceso (asfaltadas o de marram), el número de turistas y las opciones de uso de la tierra deseadas (entre desarrollo turístico, pastoreo de ganado y agricultura). Se realizó un análisis DCE con estimación jerárquica de Bayes.*

Resultados: *El estudio reveló que la introducción de restricciones en el uso de la tierra y la ubicación de los alojamientos turísticos eran los atributos más importantes para los encuestados, con unos valores medios de importancia del 30,36% y el 24,02% respectivamente. Un atributo significativamente menos importante fueron los tipos de carreteras de acceso, con una importancia media de sólo el 8,38%. El análisis de conglomerados reveló una amplia heterogeneidad en las preferencias.*

Implicaciones: *Para los responsables políticos, los profesionales de la conservación y las empresas turísticas, este estudio constituye una fuente de referencia para comprender las preferencias de desarrollo de la comunidad masai. En general, el estudio contribuye a una mejor comprensión de las comunidades locales en relación con el desarrollo turístico y el apoyo de los residentes al desarrollo y la gestión de las zonas protegidas.*

Originalidad/valor: *Este estudio llena el vacío existente en la bibliografía sobre el desarrollo turístico y el apoyo de los residentes a los desarrollos en áreas protegidas al presentar algunos límites del uso aceptable y no deseable de las áreas protegidas entre una comunidad que tiene una coexistencia compleja con un destino turístico de vida salvaje. Proporciona una perspectiva alternativa para futuras investigaciones al examinar la elección de los residentes hacia el desarrollo del destino y las preferencias por el desarrollo de infraestructuras y superestructuras turísticas utilizando un enfoque experimental.*

Palabras clave *Áreas protegidas, percepción de los residentes, desarrollo, preferencias, conjoint basado en la elección, agrupación k-mean*

Tipo de papel *Trabajo de investigación*

1. Introduction

Protected areas (PAs), such as national reserves, are often accorded the responsibility of conserving biodiversity and ecosystems that are crucial for human well-being. Many PAs have some built infrastructure within their borders and/or immediate surroundings (Fuente *et al.*, 2020; Pullin *et al.*, 2013). These structures can range from tourism buildings (e.g. visitor centres, airstrips or lodges) to villages, towns and even cities. Man-made structures and related human activities can exert multiple pressures and sometimes conflicting objectives on PAs. Fuelled by the need to alleviate poverty, maintaining cultural heritage, promoting sustainable use of natural resources, improve well-being and other development aspirations, as well as foreseeable escalation of investments in infrastructure building over the coming decades globally (Buhalis *et al.*, 2023; Gardner *et al.*, 2013; Stepinac Fabijanic and Klaric, 1993). On the

optimistic side of things, there is also a general awareness that excessive infrastructural systems in the built environment disrupt natural landscapes, not only with regards to scenic beauty but also the natural ecosystems, leading to negative environmental changes (Raiter *et al.*, 2018).

At times, undesired impacts may also include disruption of residents' way of life and cultural heritage (Galaty, 2016). Due to the ever-increasing demand for tourism development, coupled with changes in land use, the expansion of agricultural practices and infrastructure development, wildlife management authorities are often caught between the needs and interests of residents and conservation-oriented management objectives (Salafsky, 2011; Terborgh *et al.*, 2002). Wildlife tourism areas can play a part in the conservation of wildlife and provide opportunities and secure livelihoods for residents (Karanth *et al.*, 2012). However, concern has been raised by environmentalists that development initiatives have led to a focus on human welfare while largely failing to connect to environmental conservation. Over time, this has resulted in conflict between conservation and socioeconomic objectives (Salafsky, 2011; Terborgh *et al.*, 2002). Strict conservation can have an array of negative impacts, such as minimizing human use of natural resources, crop damage by wildlife and competition for space for livestock grazing, among other problems (Kariuki *et al.*, 2021). Research has shown that residents are opposed to existing conservation policies that restrict their traditional land use (Tasci, 2020). Conservation is almost entirely a human effort that ultimately involves getting resource users to support conservation objectives (Dudley, 2008). Studies have also demonstrated that when residents are unhappy with the level of conservation, they are less likely to support the objectives. Therefore, conservation advocates are constrained to frame their work as being in service of human welfare and development needs (Salafsky, 2011).

According to Hughes (2013), both wildlife and wildlife safari tourism generally advocate the protection and sustainable use of environmental resources while raising awareness of and concern about the environment. Communities living near wildlife areas have their expectations and plans for how to maximize the tourism opportunity for their economic well-being, preserving biodiversity while undergoing the necessary infrastructural developments aimed at attracting tourists (Hughes, 2013; Job and Paesler, 2013; Kalvelage *et al.*, 2021, 2022; Ozturk *et al.*, 2015). For the community, benefits are linked to poverty alleviation, increase in entrepreneurship opportunities, a boost in trade, improvement in quality of life and jobs created (Kanwal *et al.*, 2020; Ozturk *et al.*, 2015). For example, safari parks across Africa not only allow for the protection of wildlife species but also generate revenue as people from across the world visit on an annual basis. At times, however, communities are displaced and forced to change their mores and cultural heritage, whereas wild animals lose their breeding and feeding grounds due to tourism development (Higham *et al.*, 2008; Sirima and Backman, 2013).

Despite the general consensus that infrastructure development is a significant driving force for any economy to attain rapid growth, the question arises about whether more built infrastructure is beneficial or detrimental to wildlife tourism destinations. In general, all stakeholder preferences are important. However, residents are particularly affected by the development of protected and conserved areas. Recent literature still indicates in an increase in debates around topics relating to uncontrolled nature of tourism development in PAs (Newsome, 2014, 2021; Schulze *et al.*, 2018), problem of over tourism (Maingi, 2019), misguided use (Newsome and Hughes, 2018) and management inefficiencies (Geldmann *et al.*, 2015; Nyanghura and Abdallah, 2023). Researchers have also attributed recent human–wildlife conflicts to land-use conflict (Abukari and Mwalyosi, 2018; Cui *et al.*, 2021; Mukeka *et al.*, 2019; Syombua, 2013). In short, the relationship between residents and tourism developments in PAs tend to be a complex one.

To this end, this study empirically examines the preferences of residents towards nature-based destination developments and tourism supra-structure development in regions that

rely heavily on nature-based tourism. The study mainly targets the Maasai Mara ecosystem (Narok county, Kenya) and samples respondents drawn from a population of residents of villages adjacent to the ecosystem. The Maasai Mara ecosystem in Kenya (often referred to simply as the Mara) is an interesting area to study, given the co-existence of wildlife and pastoral people in the Maasai Mara ecosystem and the lands adjacent to it. The Mara is a much-visited wildlife tourism destination dealing with rapid infrastructure developments in recent years. Studies have established that the developments of economic value of environmental goods and services ought to be compatible with the needs of residents. To do this successfully, residents' involvement and support is paramount. A conjoint based choice experiment (CE) is used to assess residents' preferences for tourism infrastructure developments in the Maasai Mara National Reserve. A DCE is especially meaningful, as it not only states importance (s) individuals place on various destination attributes, but it also assigns utility values to all the attributes and levels presented to the study participants and allow us to make conclusions regarding which threshold of utility must be reached in order for residents to support development and management options.

Our study is particularly relevant given the trajectory of infrastructure development in recent decades. Coupled with other challenges including act of balancing the changes to modern life for many of communities that live adjacent to PAs (in the case of the Maasai Mara community, from previous nomadic pastoralism lifestyle) as well as the lack the of research that often means the government can ignore their needs and well-being (Vogel *et al.*, 2023; Western *et al.*, 2019). These challenges often influence residents' attitudes towards tourism development and other development objectives set by the government in such areas. In this regards, this study seeks to look into the interplay of different attributes influencing residents' support towards PA destination development and preferences for infrastructure and tourism supra-structure development. It is guided by the following research questions.

RQ1. How are different attributes of the protected area destination development interrelated in the support for tourism development?

Studies have shown that demographics and benefit related concerns determine whether residents support developments (Chung *et al.*, 2018; Lindberg and Veisten, 2012; Walde *et al.*, 2019). Therefore, it is hypothesized that the interplay between attributes characterizing developments of PAs differ between participants groups. Based on that, a second research question is useful for analysis of the datum:

RQ2. How do residents' characteristics affect the interrelationship of different attributes of protected area in relation to management of infrastructure and land-use restrictions? What factors explain preference heterogeneity?

Based on the results of our study, management of infrastructural developments and land-use restrictions in such PA settings can be achieved when policy makers can determine whether tourism development and the development needs of residents are compatible. Moreover, the study also adds to the few but increasing number of CEs studies released in emerging economies.

2. Study area – Maasai Mara-Narok county, Kenya

Narok county, home to the Maasai Mara National Reserve and the Maasai Mara community, is in the Rift Valley province of Kenya (Figure 1). Narok county is one of Kenya's top tourist destinations. The county has seen rapid growth in the human population from 470,000 in 1999 through 720,000 in 2009 to 1,157,873 in 2019 (Kenya National Bureau of Statistics, 2019; Ogutu *et al.*, 2016). More than one-third (33.8%) of the county's population lives in extreme poverty (Asige and Omuse, 2022; Kenya National Bureau of Statistics, 2019). Narok county supports around a third (30%) of the wildlife population in Kenya (Ogutu *et al.*, 2016). The Maasai community in the county is known for owning a vast share of protected lands, where they co-exist with the wild animals. Many of the animals rely on private and communal lands

Figure 1 Study area

Source: Ojijo and Steiger (2023)
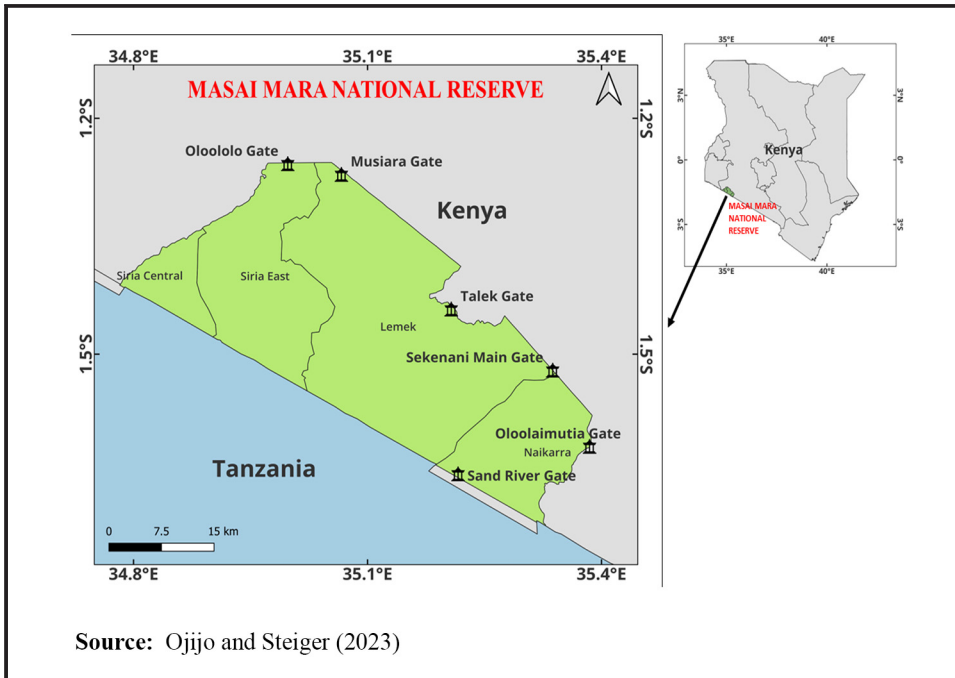
(Ogutu *et al.*, 2014). The Maasai Mara ecosystem is part of the Serengeti-Mara ecosystem. The Maasai Mara covers a land area of around 6,400 square kilometres, whereas the Serengeti is approximately 10 times bigger, but there are a hundred times more camps and lodges found in the Maasai Mara than in the Serengeti (Kamau and Waudo, 2018).

In recent years, studies have reported a rift between the government and the Mara residents over the control of resources has widened (Lamprey and Reid, 2004; Veldhuis, 2019). Sitati *et al.* (2003) argued that the relationship between residents of the Maasai Mara community and the relevant governing authorities can be attributed to powerful hierarchical governance systems that hinder the Masai tribespeople in the region from fully participating in the socioeconomic developments. The specific challenges range from human encroachment on the PAs, destruction of crops, sub-division of land and wildlife tourism using livestock-grazing areas (Nampushi and Nankaya, 2020; Nyhus, 2016; Okech, 2011; Okello, 2006). Some experts have gone as far as stating that the hopes for reintegrating the Maasai Mara community with wildlife protection is growing dim (Lamprey and Reid, 2004). Emphasis is placed on the land-use options and need to find more profitable and reliable sources of income (Homewood *et al.*, 2001).

To this end, the discrete choice experiment (DCE) was used among the Maasai Community based in the villages and towns around the Maasai Mara National Reserve, in Narok county (Kenya). The Maasai Mara National Reserve in Kenya is an interesting area to study, given the co-existence of wildlife and pastoral people in the region and the lands adjacent to it. The ecosystem is a much-visited wildlife tourism destination dealing with rapid infrastructure developments in recent years (The World Bank, 2018). The Maasai community in the region is known for owning a vast share of the protected lands, where they co-exist with the wild animals.

3. Materials and methods

The study used conjoint analysis to evaluate the preferences of residents towards various attributes of development and management of PA and its environs, to determine relative

importance of the attributes to residents and to determine whether the preferences are heterogeneous. Conjoint analysis is a multivariate form of statistical analysis that allows researchers to understand respondents' preferences for a set of attributes. The two main outputs of a conjoint analysis are the importance of each attribute and the perceived value of each level within the attribute. To quantitatively explore heterogeneity in our datum, we first performed hierarchical Bayes (HB) estimation on Sawtooth (lighthouse studio), then analysed the results further using K-means clustering algorithm to group datum by their similarities in attributes to a centre point (Nainggolan *et al.*, 2019). HB estimation was performed to calculate the utility parameters for each respondent, enabling the estimation of overall attribute importance as well as the preferences of levels within the attributes. Through an HB estimation, we were able to derive part-worth utilities for the levels within the attributes that determine respondent's choice. The more positive the part-worth is, the more desired the level is.

3.1 Study design and data collection

The attributes examined in the DCE were informed by a pre-study conducted through focus groups discussions and interviews with residents of Narok County (conducted in 2021–2022) and a literature review to aid in the specification of attributes that respondents value and investigated residents' views on infrastructure development outcomes in the study area in terms of attributes that could be placed within the development setting (Liu *et al.*, 2017; Nelson, 2012; Ojijo and Steiger, 2023). The DCE questionnaire was created using the Sawtooth software (www.sawtooth.com). A total of five relevant attributes with two to three levels were chosen for the study (Table 1).

Respondents were shown scenarios representing hypothetical destination characteristics and asked to choose the most preferred set of attributes (in line with their interests) out of the two options presented to them. The "NONE option" or status quo option was always available in the choice set in case the two available options presented on a screen did not interest a respondent. The questionnaire was developed in English and consisted of three sections: the CE with 12 choice tasks; categorical survey questions where respondents were asked to indicate their motivations for choosing the various attributes presented in the choice tasks; and demographics (gender, age, location, proximity to the reserve, level of education and employment status).

Given that our study area is in a remote area, respondents were approached face-to-face using tablets and mobile phones. Due to time constraints and the cost of research, we used seven mobile devices (tablets and phones) and approached several participants at the same time at their place of work. The survey focused on residents of Narok county and

Table 1	Choice experiment attributes and levels
Attribute	*Level*
Type of tourism development: accommodation	Lodges
	Campsites
Location of tourism accommodations	In the reserve
	On community land
	Nearby towns and shopping centres
Tourist numbers	Increase number of tourists
	Reduce the number of tourists
Types of access roads (located on community land)	Marram (rough roads)
	Tarmac (paved roads)
land-use restrictions	On agriculture
	On livestock grazing
	On tourism accommodation buildings

Source: Ojijo and Steiger (2023)

mainly on those working and living within 50 kilometres from the PA. We purposively sampled equal proportions of women and men when approaching potential respondents to avoid gender bias in our analysis. One of the primary goals of the sampling strategy was to include basic social-demographic structure of the Mara region (geographical coverage) and to ensure that the study participants could read and interpret the questionnaire without assistance. We mostly visited villages (often located near one of the reserve gates), shopping centres and places of worship.

In the end, data for the study were collected through a self-administered questionnaire distributed to 334 residents of the Maasai Mara ecosystem and adjacent villages and towns in December 2022 and January 2023. The socio-demographic questions were presented to the study participants after the choice tasks. Out of the 334 approach participants, 318 completed the choice tasks, whereas 299 participants completed all the questions on the questionnaire. Lighthouse studio (a Sawtooth package) was used to determine which attribute has the highest percentage of relative importance (Table 1).

4. Results

4.1 Profiles of respondents

A slight majority of the respondents were male 151 (50.5%) and 148 female respondents that completed the entire survey. The majority of participants are in the age category between 35 and 54 years. The sample included respondents working in the tourism sector, military and police services and health-care workers. On average, respondents reported that live within 10 and 20 km from the reserve (Table 2).

Overall, in terms of gender, age, occupation and employment sectors and villages of residence, the sample represented both Narok county and Kenya well. Specifically, our study sample is appropriate given that the latest census, 2019 Kenya Population and Housing Census showed that in Narok county, only 8% of the population have no formal education, about 10% hold primary education certificates and more than 26% hold secondary education and above [Kenya National Bureau of Statistics (KNBS), 2019]. At the national level, age structure shows that about 55.28% of the population is between the age of 15 and 59 years (75% of this group consist of the youth between 15 and 35 years old) and just 6% of the population are aged 60 years and above. We further relied on recent studies that used survey-based CEs (Fichter and Román, 2023; Jia et al., 2023; Tasci et al., 2023) as well sample size rule of thumb for CEs (see Alwosheel et al., 2018 for an extensive review).

4.2 Respondents' preferences structure

Table 3 presents the estimated part-worths and shows levels that are more or less preferred by the sample average. Positive utilities correspond to desired levels and negative utilities correspond to less preferred levels. While the part-worth utilities reflect the desirability of a specific attribute level, they do not clearly point out the relative importance of the individual attributes in comparison to the rest of the attributes studied. The output indicates that the introduction to land-use restrictions and the location of tourism accommodations were the most important attributes for the respondents, with average importance values of 30.36% and 24.02%, respectively. Significantly less important was the types of access roads with the average importance of just 8.38%. In addition, based on the utility estimates for each level of attributes, residents preferred that campsites are built at the destination, new tourism accommodations to be built in the reserve, more tourists are allowed to visit, roads located on community lands are unpaved (marram roads) and land-use restrictions are imposed on construction of further tourism accommodation.

Table 2 Descriptive statistics ($n = 299$)

	n = 299
Gender	
Male	50.5
Female	49.5
Age range	
18–24	9.0
25–34	21.1
35–44	23.8
45–54	26.1
55–64	9.7
65–74	4.0
75 and above	6.4
Level of education	
No formal education	9.0
Primary education	11.0
Secondary education	42.5
Higher education	37.5
Occupation and employment status	
Agriculture	9.4
Homemaker	6.0
Teacher/educator	10.7
Manufacture	3.0
Retail	12.7
Tourism	10.7
Military and other police services	9.7
Health and social work	7.4
Government and public administration	9.0
Banking and legal services	4.0
Transportation	4.7
Student	5.7
Retired or unemployed	3.3
Other	3.7
Proximity of participants' homes to the reserve	
Live in the Maasai Mara National Reserve	11.0
Not more than 10 km from the reserve	24.4
Not more than 20 km from the reserve	42.5
More than 20 km from the reserve	22.1

Source: Ojijo and Steiger (2023)

Table 3 Overview of relative importance scores for the attributes and their corresponding utilities

Attribute	Attribute levels	Utility values	Average importance values (%)
Tourism accommodations	Lodges	−4.62270	8.38
	Campsites	4.62270	
Location of new tourism accommodations	On community land	−9.59884	24.02
	In the reserve	31.24939	
	Nearby towns	−21.65055	
Tourists	Reduce the number of tourists	−45.88567	21.28
	Allow more tourists	45.88567	
Main roads located on community lands	Paved (tarmac the roads)	−33.96894	15.95
	Unpaved (marram roads)	33.96894	
Introduce land-use restriction	On agriculture (farming)	30.15155	30.36
	On more tourism accommodation building	38.28209	
	On livestock grazing	−68.43364	

Source: Ojijo and Steiger (2023)

The overall results of the conjoint analysis represent mean values of residents' preferences at the entire sample level, whereas preference-based clustering allows the analysis of subgroups by their similarities in attributes to a centre point. Here, we applied the K-means clustering algorithm. Using the levels within the attributes (utility values), three clusters are identified: the location of tourism accommodations (location oriented), the number of tourists (tourism volume oriented) and the land-use regulations-oriented segment. Their size turned out to be relatively unbalanced, with 53.18%, 33.11% and 13.71% of respondents. Cluster analysis based on the levels within the attributes is presented in Figure 2.

The cluster analysis revealed three distinct clusters regarding relative importance of the presented attributes regarding respondents' different preferences for tourism development and land-use management in the Mara region. Interestingly, all three clusters least value the type of tourism accommodation. These differences in attribute importance indicate different priorities for development. Part-worths point out the emphasis on preference for land-use restriction on livestock grazing and increase in tourists by the two clusters that contain the highest number of respondents (Clusters 1 and 2). We also see that when respondents are more concerned with the land-use restrictions on livestock grazing, again the first and second segments, they are also interested in marram roads and development of tourism development's location in the reserve land.

4.3 Cross-tabulation analysis

Both the conjoint analysis and the cluster analysis do not distinguish the respondents by any specific demographic characteristics. Therefore, cross-tabulations were run to make the analysis more meaningful by comparing the differences between clusters based on various demographic characteristics of the respondents. Table 4 shows a summary and description of the clusters using survey datum (also see Appendix for more details on the crosstab analysis). The association between gender and the clusters is relatively balanced. Noteworthy, Clusters 2 and 3 contained more women than men. Regarding occupation and employment status, all sectors are represented in Cluster 1 similarly to the full sample, except the transportation sector that is underrepresented in Cluster 1 and overrepresented

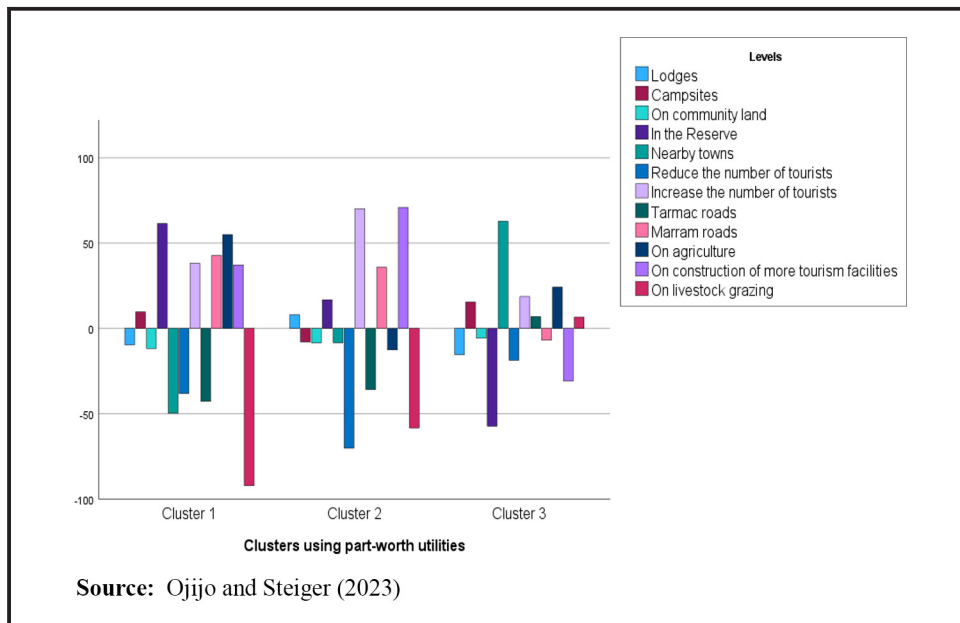| **Figure 2** | Cluster analysis showing preference share among three clusters |

Source: Ojijo and Steiger (2023)

Cluster	Summary (cluster name)	Description
	Table 4 Authors' summary and description of clusters using survey datum	
1	Land-use oriented	This cluster consist of locals who are strongly opposed to land-use restrictions on livestock grazing land as well as construction of tourism accommodation in the nearby towns. In addition, they prefer that tourism accommodations are built in the reserve rather than on community land. It is the largest group, containing 53.18% of the sample and it is made up of: — more men than women; — majority of the respondents (45 – 54 and 35 – 44 years of age); — majority of the respondents residing in the reserve land; and — majority of those living within 10Kms from the Reserve Noteworthy, this cluster consisted of the highest number of respondents who reported that they are unemployed and retired. Results indicated that the further away from the reserve a participant home is, the least likely for the respondents to belong to this cluster
2	Tourism volume oriented	The second cluster contains 33.11% of the study sample. They are the most sensitive to regulations on the number of tourists. Specifically, they prefer an increase in the number of tourists. Interestingly, in addition to strongly supporting an increase in the number of more tourists, members of this cluster also strongly support land-use restrictions on construction of more tourism facilities. They are also relatively sensitive to land-use restrictions on livestock grazing and construction of tarmac roads. Consists of: — more women than men; — majority of the respondents in both two of the youngest age categories (18 – 24 and 25 – 34 years old); and — majority of respondents in the transportation sector and majority of the student respondents
3	Location oriented	This is the smallest group. Members of this cluster are the most sensitive to the location of tourism accommodations. Like the other two segments, they would also like to see more tourists visiting the destination. However, they strongly prefer that tourism accommodations are built in nearby towns and strongly reject construction of more tourism accommodations on community land. They are also the only group that supports land-use restrictions on livestock grazing and the only one that desires that land-use restrictions are not imposed on construction of more tourism facilities. This cluster consists of: — more women than men; — least number of participants between the ages of 18 – 24 and 25 – 34 years old (the youngest age categories); — the least number of student respondents; and — higher number of respondents that reside closest to the reserve

Source: Ojijo and Steiger (2023)

in Cluster 2. Cluster 2 also contained most of the student respondents, whereas Cluster 3 contained the least number of student participants. In addition, the majority of the unemployed and retired participants mainly belonged to Clusters 2 and 3 and only a few of them belong in Cluster 1. Regarding proximity to the reserve, we see that many of the respondents living within the reserve are members of Cluster 1. It appears that the further away from the reserve a participant home is, the less likely they are to be a member of Cluster 1 and the closer one lives to the reserve, the less likely they are to be a member of desirable Clusters 2 and 3.

5. Discussion and conclusions

The basic assumptions of our study are that residents' preferences are heterogeneous in nature, and that if individuals receive a benefit from a resource, they feel obliged to reciprocate the benefits in the form of positive response. The aim of the study was to quantify relative preferences of the residents towards infrastructure and tourism superstructure development in a tourism-based PA. In this regards, a DCE was used among the Maasai community based in the villages and towns near the Maasai Mara National Reserve in Kenya. The attributes included type of tourism accommodation, location of tourism accommodations, types of access roads (tarmac or marram), tourist numbers and desired land-use options (between tourism development, livestock grazing and

agriculture). In the literature, there are only few papers that use CEs to analyse residents' attitude towards and support in the context of tourism development (Fichter and Román, 2023; Lindberg and Veisten, 2012; Walde *et al.*, 2019). Even fewer use the approach to present case studies from the global south. The finding of these studies revealed that the introduction to land-use restrictions and the location of tourist accommodations were the most important attributes for the respondents. A significant less important attribute was the types of access roads.

The results of our study indicate that offering residents available land for grazing their livestock and constructing tourism accommodation in the nearby town such can stimulate residents support for developments and management strategies that are proposed. This is an indication that the Mara community is likely to prioritize development and management strategies that are land-use oriented, tourism volume oriented and those that consider the location of tourism facilities (location oriented). Such analyses have been done in relation to factors that enhance residents' support (Buhalis *et al.*, 2023; Ozturk *et al.*, 2015; Walde *et al.*, 2019). These studies agree that residents' support is significantly enhanced by factors that they perceive to have a positive implication on their socio-economic well-being. Nampushi and Nankaya (2020), for example, found that attitudes of residents towards tourism and conservation objectives was notably influenced by inclusion of livestock in the access provisions.

The cluster analysis revealed three key participant groups: land-use use oriented, tourism volume oriented and the location oriented, the three most noticeable demographic characteristics identified in the cluster analysis were proximity to the reserve land, age and gender. In our study, the young generation are more likely to support an increase in the number of tourists. Male residents are more likely to reject policies that they dim unfavourable to livestock grazing than women. With regards to proximity, the closer a resident's home is to the reserve, the more likely they are to support construction of tourism accommodations on the reserve land rather than on community land. They are also most likely to reject development and management strategies that seek to construct tourism accommodations in the nearby towns. This could be explained by the need to keep the community land free for livestock use while at the same time needing to access tourism facilities to seek employment as the towns are a distance away from the reserve and from the community land areas. As in previous studies, development preferences varied can be explained by various factors (Chung *et al.*, 2018; Lindberg and Veisten, 2012; Walde *et al.*, 2019). For example, Walde *et al.* (2019) found that young generation within their study respondents strongly preferred economic developments rather than conservation.

Our results revealed that residents would respond favourably to development and management strategies that include construction of campsites in the reserve, provisions that allow more tourists to visit the destination, construction of marram roads on community lands that are adjacent to the ecosystem and land-use regulations that allow residents to graze their livestock. In addition, it also shows that residents of the Mara prefer that tourist accommodations are built in the reserve rather than on community land. Ultimately, the implication of this is the need to include livestock grazing provisions in development and management strategies as this may stimulate residents' support and result in positive attitude towards combined development goals for the destination.

One significant contribution of this study is providing a basis for policymakers, conservation practitioners and tourism businesses to understand the development preferences of the Maasai community and to ensure development and management of tourism-based PAs are compatible with residents' needs. In general, the study contributes to a better understanding of local communities in relations to tourism development in PAs. It provides an alternative perspective for future research by examining residents' choice towards destination development and preferences for infrastructure and tourism superstructure development using an experimental approach. It offers a contribution to tourism

development issues in the global south and specifically to the debate on how residents value the benefits gained from infrastructure and superstructures developed. It also provides a scope for a continuous evaluation of residents' preferences for infrastructure and superstructure development in nature-based tourism PAs globally, the vulnerabilities these preferences may pose on the tourism sector and the need to assess primary factors influencing residents' support for tourism developments in an historical development age for many countries in the global south, which are home to many of the planet's most biologically diverse and environmentally significant ecosystems.

Still, this research was subject to several limitations. Firstly, limited time for data collection due to limited finances. Secondly, the proportion of individuals with the literacy level to read and interpret the questionnaire without any assistance might have been underestimated in our study as older residents were less likely to participate in the study. A possible solution would be to use pictures to help visualize the attributes included in the choice tasks.

Future research is required to investigate the perceptions of tourists visiting the destination, e.g. to understand their preferences for location of tourism accommodation facilities, type of tourism accommodation facilities and type of roads to be built at the study destination. In addition, the case study scope of the study limits the generalization of the results, future studies should collect data from other tourism destinations in PAs to enhance the generalization of the geographical settings results of similar studies. This would also result in an investigation of possible diverging preferences of communities that live within and/or close to PAs using the same methodology. Especially, PAs destinations that are home to communities that rely on PAs resources for their social-economic welfare.

5.1 Implications

Policymakers, conservation practitioners and tourism businesses should strengthen residents' support by including attributes that are important to them in the development and management strategies. No single tourism volume-oriented development strategy can positively influence residents support for development and management strategies. Our study suggests that to date, development and management strategies that are favourable to livestock grazing as well as those that allow more tourists to visit the PA are more likely to be supported by the Mara community. However, livestock grazing is more valuable than tourism facility development. Therefore, tourism development is important to the Mara community but livestock grazing provisions should not be ignored by policymakers. Finally, careful understanding of different demographics is necessary, that is, different residents are interested in different development and management options, i.e. our study revealed that the younger generation residents support tourism volume-oriented strategies, whereas the older generation support land-use oriented strategies. To sum up, residents' support is strengthened when development and management attributes are compatible with their development needs and preferences.

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Further reading

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Appendix

Table A1	Cross-tabulation analysis between clusters based on the levels within the attributes and demographic characteristics (Ojijo and Steiger, 2023)				
	Cross-tabulation analysis between identified clusters and demographic characteristics (n = 299)				
			Clusters: attribute levels[a]		Total per demographic profile
			Cluster 1	Cluster 2	Cluster 3	
Gender	Male	Count (% within gender)	84 (55.6%)	48 (31.8%)	19 (12.6%)	151
		% within clusters	52.8%	48.5%	46.3%	
	Female		75 (50.7%)	51 (34.5%)	22 (14.9%)	148
			47.2%	51.5%	53.7%	
Age range	18–24	Count (% within age range)	9 (33.3%)	13 (48.1%)	5 (18.5%)	27
		% within clusters	5.7%	13.1%	12.2%	
	25–34		37 (58.7%)	22 (34.9%)	4 (6.3%)	63
			23.3%	22.2%	9.8%	
	35–44		38 (53.5%)	25 (35.2%)	8 (11.3%)	71
			23.9%	25.3%	19.5%	
	45–54		49 (62.8%)	19 (24.4%)	10 (12.8%)	78
			30.8%	19.2%	24.4%	
	55–64		14 (48.3%)	10 (34.5%)	5 (17.2%)	29
			8.8%	10.1%	12.2%	
	65–74		7 (58.3%)	1 (8.3%)	4 (33.3%)	12
			4.4%	1.0%	9.8%	
	75 and above		5 (26.3%)	9 (47.4%)	5 (26.3%)	19
			3.1%	9.1%	12.2%	
Level of education	No formal education	Count (% within education)	13 (48.1%)	8 (29.6%)	6 (22.2%)	27
		% within clusters	8.2%	8.1%	14.6%	
	Primary education		13 (39.4%)	10 (30.3%)	10 (30.3%)	33
			8.2%	10.1%	24.4%	
	Secondary education		75 (59.1%)	39 (30.7%)	13 (10.2%)	127
			47.2%	39.4%	31.7%	
	Higher education		58 (51.8%)	42 (37.5%)	12 (10.7%)	112
			36.5%	42.4%	29.3%	
Occupation and employment status	Agriculture	Count (% within occupation)	16 (57.1%)	9 (32.1%)	3 (10.7%)	28
		% within clusters	10.1%	9.1%	7.3%	
	Homemaker		9 (50.0%)	8 (44.4%)	1 (5.6%)	18
			5.7%	8.1%	2.4%	
	Teacher/educator		16 (50.0%)	12 (37.5%)	4 (12.5)	32
			10.1%	12.1%	9.8%	
	Manufacture		5 (55.6%)	4 (44.4%)	0 (0.0%)	9
			3.1%	4.0%	0.0%	
	Retail		21 (55.3%)	12 (31.6%)	5 (13.2%)	38
			13.2%	12.1%	12.2%	
	Tourism		22 (68.8%)	8 (25.0%)	2 (6.3%)	32
			13.8%	8.1%	4.9%	
	Military and other police services		18 (62.1%)	4 (13.8%)	7 (24.1%)	29
			11.3%	4.0%	17.1%	
	Health and social work		11 (50.0%)	8 (36.4%)	3 (13.6%)	22
			6.9%	8.1%	7.3%	
	Government and public administration		16 (59.3%)	7 (25.9%)	4 (14.8%)	27
			10.1%	7.1%	9.8%	
	Banking and legal services		7 (58.3%)	3 (25.0%)	2 (16.7%)	12
			4.4%	3.0%	4.9%	
	Transportation		4 (28.6%)	6 (42.9%)	4 (28.6%)	14
			2.5%	6.1%	9.8%	
	Student		7 (41.2%)	9 (52.9%)	1 (5.9%)	17
			4.4%	9.1%	2.4%	
			2 (20.0%)	4 (40.0)	4 (40.0%)	10

(*continued*)

Table A1

Cross-tabulation analysis between identified clusters and demographic characteristics (n = 299)

			Clusters: attribute levels[a]			Total per demographic profile
			Cluster 1	Cluster 2	Cluster 3	
	Retired or unemployed		1.3%	4.0%	9.8%	
	Other		5 (45.5%)	5 (45.5%)	1 (9.1%)	11
			3.1%	5.1%	2.4%	
Proximity of participants' homes to the reserve	Live in the Maasai Mara National Reserve	Count (% within location)	15 (45.5%)	9 (27.3%)	9 (27.3%)	33
		% within clusters	9.4%	9.1%	22.0%	
	Not more than 10 km from the reserve		39 (53.4%)	25 (34.2%)	9 (12.3%)	73
			24.5%	25.3%	22.0%	
	Not more than 20 km from the reserve		73 (57.5%)	39 (30.7%)	15 (11.8%)	127
			45.9%	39.4%	36.6%	
	More than 20 km from the reserve		32 (48.5%)	26 (39.4%)	8 (12.1%)	66
			20.1%	26.3%	19.5%	
Total per cluster		*Count*	*159*	*99*	*41*	*299*

Notes: Percentages and totals are based on respondents; [a]Dichotomy group tabulated at value 1

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