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Ranking and Evaluating Tourists Heterogeneous Preferences and Destination Competitiveness Using Multi-Criteria Decision Models

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Abstract

The purpose of the paper was to evaluate destinations and identify factors that drive tourists to visit Zimbabwe's main tourist destinations. A hybrid multi-criteria decision-making method that combines the technique for order of preferences by similarity to ideal solution (TOPSIS) and the fuzzy analytic hierarchical process (FAHP) was used to analyse data. Data was collected using a structured questionnaire that was administered to ten tourism experts who were chosen using a purposive sampling technique. Our findings demonstrate that tourists are primarily attracted by destination image, price competitiveness, tourism support and experiential satisfaction. In terms of identified criteria, our findings also establish that Victoria Falls, Hwange National Park, Matobo National Park and Great Zimbabwe, respectively, are the most preferred destinations for tourists visiting Zimbabwe. Government incentives for developing locally owned accommodation (homestays) and integrating local foods in restaurants can help to promote destination image, improve tourism support and in turn, tourists' experiential satisfaction. Channelling tourist receipts to local infrastructure like roads, schools, hospitals, and social services can help to encourage community-based tourism initiatives. The main contribution of the study was pioneering a hybrid FAHZ-TOPSIS method to objectively evaluate destinations and identify factors that motivate tourists to visit famous destinations in Zimbabwe.

Keywords: Destination image; Victoria Falls; TOPSIS; Fuzzy AHP; Zimbabwe

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Introduction

Zimbabwe is a priceless destination for visitors seeking a preponderance of touristic attractions and experiences. For nonchalant and perspicacious visitors, the country is endowed with countless picturesque tourist destinations that can appeal to tourists with contrasting interests, motivations, tastes and preferences. Most tourist destinations have opportunities for game viewing, pilgrimage, wilderness experience, spiritual wellness, mountaineering activities, and cultural and spiritual immersion, all coming at competitive prices. The well-known tourist destination in Zimbabwe is Africa's only natural wonder of the world, that is, the enigmatic Victoria Falls, also known colloquially by locals as the "smoke that thunders". The country is also a befitting host to five United Nations Educational, Scientific and Cultural Organisations (UNESCO) cultural and heritage sites. These include the Great Zimbabwe National Monument, Mana Pools, Khama Ruins, Matobo National Park and the Jerusalem Cultural Dance. Freckled across the breadth and length of the country are variegated and renowned tourist destinations such as the mysterious Chirorodziva Caves, Hwange, Matusadona and Zambezi National Parks, and Mount Inyangani in the eastern highlands. For visitors motivated by cultural, pilgrimage, and health-seeking tourism, the country is one of the few in the Southern African region that enjoys a temperate climate with almost 365 days of abundant sunshine punctuated with cooler breezes. Globally, the tourism industry is expected to grow at a pace of 3.3% per year, reaching 1.8 billion tourism by 2030 (World Tourism Organisation [WTO], 2022). The World Travel and Tourism [WTTC] (2024) reports that worldwide the travel and tourism sector contributes at least 10% to the global gross national domestic product and also create 10.4% of global employment or 334 million jobs. In Zimbabwe, tourism is the third largest sector after manufacturing and agriculture and contributes 5.8% to the country's GDP and 8.6% of the total employment (WTTC, 2023) and 25% of the country's exports (Muzurura et al., 2017). Due to the capacity to generate foreign currency and other multiplier effects, the tourism sector has the greatest potential to catalyse rapid economic growth and help the country to achieve rapid sustainable national development (Chigora et al., 2020; Mutambara et al., 2023; Muzurura, 2019). Tourists visit Zimbabwe for various motives and the most common ones include; cultural and gastronomy tourism (Abdullah & Azeez, 2023; Chigora et al., 2019), experiential and rural tourism (Eric et al., 2020; Mutambara et al, 2022; Muzurura et al., 2022), spiritual, pilgrimage, religious and wellness tourism (Chigora et al., 2020; Mutambara et al., 2023; Tian & Ming, 2021; Zeng et al., 2021), adventurism and extreme tourism (Duran-Roman et al., 2021; Hall & Saarinen, 2021). In recent years, even religious tourism has been on the upward projection driven by a multiplicity of factors especially the desire to seek grace, healing powers, strengthening of faith, finding meanings to questions of life, the need to balance the body and mind, as well as seeking spiritual enrichment and piety (Muzurura et al., 2022). However, despite various tourist destination sites, the tourism sector in Zimbabwe still faces growth-inhibiting challenges such as skills flight, inadequate supporting infrastructure, poor communication network, and transport connectivity (Chigora et al., 2019). The growing number of tourist' arrivals after the COVID-19 global pandemic has intensified the competition among various destinations. Many studies show that tourism is, to a large extent dependent upon the ability of

various attraction sites and consequent activities that are needed to sustain competitive advantage (Chigora et al., 2020; Mutambara et al., 2023; Muzurura et al., 2022).

The main benefits of tourisms include enhancing local entrepreneurship and innovation especially for traditional handcrafts, authentic souvenirs (Guru et al., 2023; Kumar et al., 2022; Liro, 2021), strengthening social networks (Zhang & Zhang, 2020; Salee et al., 2022; Khan et al., 2023), addressing social inequalities (Daye et al., 2020; Egger et al., 2021), promoting inclusive growth and enhancing quality of life (Aileen et al., 2020; Anagnostopoulou et al., 2020). Tourism also helps to commodify local cultures, ceremonies and rituals and hence making them to become more profitable commercial attractions (Liu et al., 2023; Long et al., 2024; Wang et al., 2020). In mountainous regions where there are limited opportunities for gainful employment, or meaningful agricultural activities, mountain tourism can help rural communities to diversify local economies (Mutambara et al., 2023), reduce dependency on indigenous forests, and at the same time promoting the resilience of food security against the shocks of climatic and global warming (Muzurura et al., 2022). Many studies also demonstrate that foreign receipts from international tourists stimulate economic growth and national development through strengthening the balance of payments, currency and exchange rate stability (Sari, 2021; Xue et al., 2023). Most of the tourists' destinations in Zimbabwe have similar characteristics in that they have extensive diversity of ecosystems comprising of unique fauna and flora that can appeal to diverse visitors (Chigora et al., 2020; Mutambara et al., 2023). Nevertheless, the experiences may vary depending on the tourist's preferences, tastes, interests, motivations and the destination image. The main problem for the tourist is on choosing a destination in Zimbabwe given that most destinations are competitively priced. The decision-making is likely to be a complex process involving weighing a multiplicity of factors, ranging from physiological, cultural, spiritual, and socio-economic factors. Against this background, the main objective of the paper is to apply a hybrid multi-criteria decision-making making that combines the FHAP and the TOPSIS techniques to rank motivators and key tourist' destinations in Zimbabwe.

The study is significant for many reasons. First, tourism plays an essential role to the growth and resilience of local economies in terms of reducing poverty, creating employment, ensuring food security and generation of export receipts (Daye et al., 2020; Egger et al., 2021; Khan et al., 2023; Salee et al., 2022; Zhang & Zhang, 2020). Second, many tourist' destinations in Zimbabwe are increasing becoming highly competitive due to declining tourist' arrivals. It has now become more imperative for tourist destinations in Zimbabwe to be conscious of what needs to be done to attract, retain and new visitors to sustain their competitive advantages. Third, Zimbabwe has not been spared from the incapacitating effects of climatic changes and global warming, especially their impact on agricultural productivity (Bire et al., 2021). The tourism sector could be one potential avenue that can assist the country to diversify and revitalise the fragile economic growth rate. Fourth, and perhaps more important reason, the selection by tourists of destinations to visit in Zimbabwe is not easy, expected and requires complex decision-making processes. The country has numerous, diverse and highly competitive tourist destinations whose cost structure is almost perfectly elastic demand. Determining key motivators and ranking tourists' destinations can assist suppliers and consumers of touristic products to craft competitive strategies that minimise the costs of travel, yet making their visits memorable. Numerous studies demonstrate that what makes a destination memorable is a combination of various attributes such as recollection experiences, perceived service quality, cost, cognition behaviour, objective knowledge, prejudice, impressions, emotional thoughts and imaginations (Ding et al., 2021; Wu et al., 2018; Xue et al., 2023). The multifaceted characteristics of tourism destinations and drivers present a formidable challenge for aligning tourism resources and attractions with individual tourist motivations and preferences. The rest of the paper is organised as follows. The second part provides a brief literature and empirical review followed by the methodology section in part three. The fourth section covers findings and discussions. The final section provides recommendations and conclusions.

Theoretical and empirical literature review

In this section we review the main theory that has often been used to explain tourist drivers as well as empirical literature on tourism.

Theoretical literature review

One of the main theory that explains why tourists visit certain countries is the Plog's model of allocentricity and pyschocentricity (Plog, 1974, 1990, 1991 1991a). The allocentricity and pyschocentricity model delineates tourists' personality types along a continuum that approximates a normally distributed curve. This continuum is categorised into five segments namely (1) Psychocentric (Dependable), (2) Near Dependables (Near-Psychocentrics), (3) Mid-Centric, (4) Near-Allocentrics (Near Ventures) and (5) Allocentrics (Venturers). At one extreme end are psychocentric visitors who are generally more risk-averse, cautious, nervous, prefer self-inhibited and little adventuresome (Plog, 1990). According to this theory, polycentrics prefer familiar vocational travel destinations, seek familiarity, desire little activity while travelling and largely travel with tour groups. On the other extreme end are allocentrics who are described as those visitor who want to see, do new things and explore the world. Allocentrics are characterised by being outgoing and self-confident and often travel to seek novel experiences such as underdeveloped tourism markets (Plog, 2002). The venturers prefer to travel individually or in small groups (Plog, 1991). Between these two extremes are mid-centric travellers who in most cases constitute the majority travellers. Mid-centrics have characteristics of both the near-psychocentric and near-allocentrics. According to Plog (1990), mid-centrics lean in neither the tried-and-true direction of the psychocentrics nor the variety seeking direction of the allocentrics. After an attractive destination has been found by the allocentrics, those visitors with near-allocentrism are among the first major wave of adopters (Merritt et al., 2018; Piuchan, 2018; Jeon et al., 2018). Unlike near-allocentrics, visitors with near-psychocentrism characteristics are not

pioneers but most likely try a destination after it has been well-travelled (Cortina et al., 2020; Godovykh, 2021). Plog (1974) argued the chosen destination often exhibit characteristics that are similar to those of the tourists.

Empirical literature review

Why do people travel? Why do they just stay home? And what is there for tourists to do there? These are well-interrogated tourism-related questions that have been addressed in many contemporary studies (Lu et al., 2024; Liu et al., 2023; Xue et al., 2023; Mutambara et al., 2023). Many research provide rationale for travelling including satisfaction and loyalty, recreation and seeking novelty (Cortina et al., 2020; Piuchan, 2018), destination image, unique experiences, and iconic landmarks (Eric et al., 2020; Egger et al., 2021; Helgadóttir et al., 2019), desire for escape, service attributes (Otoo et al., 2021). Other studies use the utility theory and suggests that tourists travel to maximise satisfaction and hence base their decisions on logic, rationality and complex reasoning (Daye et al., 2020; Long et al., 2024; Salee et al., 2022), shopping prospects (Sirakaya et al., 2003), destination image (Beralda et al., 2019). Many studies use the rational choice theory which postulates that destination choices are hierarchically selected until the final decision is derived (Eslami et al., 2019; Lei & Law, 2019; Lu et al., 2024; Sari, 2021). Economic factors such as travel costs, exchange rates, and the impact of budget constraints on tourists' decision making regarding a destination have also been interrogated (Ding et al., 2021; Hendriks et al., 2020; Wong et al., 2020). A number of studies cite cultural and social factors such as societal trends, cultural norms, online reviews, social media trends, cross-cultural exchanges, travel influencers, and religious beliefs among others as shaping tourists' decision-making process (Anaya & Lehlo, 2020; Kimaro et al., 2023; Khasanah, 2023; Long et al., 2024; Sahn & Cezlan, 2022; Shan et al., 2023). Most studies concur that the decision by a tourist of visit a destination is not linear by a highly complex and multidimensional process that involves several rungs of decision making (Bire et al., 2021a; Carneiro et al., 2018; Eslami et al., 2019; Stoffelen et al., 2020; Wong et al., 2020; Wu et al., 2018). The decisions are motivated by a number of factors that can be divided into two psychological (internal) and non-psychological (external) (Gursoy et al., 2019; Sidharth et al., 2024). In recent years the proliferation of digital technologies such as mobile apps, review aggregators and booking platforms have transformed tourists' decision making process (Crittenden, 2020; Jeon et al., 2018; Merritt et al., 2018; Rumukumba & Sethwana, 2024), Tourist's apps enable visitors to compare options, plan travel and empowering tourists to customise their itineraries and experiences in accordance with their preferences (Egger et al., 2021).

Whilst tourism comes with many benefits such as cultural exchange, preservation of heritage, promote global citizenship and local community empowerment (Bire et al., 2021; Lu et al, 2024; Salle et al., 2022; Sari, 2021), it may also have some challenges such as cultural commodification, social disruption, cultural erosion and conflicts (Aileen et al., 2022; Amare, 2022; Goeltom et al., 2023; Lei and Law, 2024). From theoretical and empirical literature, the study proposed the following conceptual framework Over years, a number of multi- criteria decision making approaches (MCDM) have been developed to consumers of products and service improve multi-criteria decision-making in different fields (Agarwal, 2022; Cai et al., 2023; Liao et al., 2023). A MCDM is concerned with making decisions in the presence of multiple objectives involving quantifiable, non-quantifiable and multi-criteria factors (Gebre et al., 2023; Patil et al., 2022). The multiple objectives are normally conflicting and hence, the solution is largely dependent and on the preferences of the decision maker (Goswami et al., 2020; Sahoo et al., 2024). In many real-consumer decisions there are multiple objectives that must be simultaneously considered given various factors (Gebre et al., 2023; Goswami and Behera, 2023 Sousa et al., 2024). Most MCDM approaches offer avenues to explicitly account for multiple objectives and criteria (Omerali & Kaya, 2022). They allow the decision-maker to come up with a balance among competing goals (Castello-Sirvent et al., 2022; Goswami, 2020; Sharma & Sehrawat, 2020). This is because MCDM models capture trade-offs and preferences of decision makers, and therefore permit the identification of optimal solutions that are in line with preferences of the decision maker (Cai et al., 2023; Khan et al., 2023; Yenugula et al., 2023).

The most popular MCDM include the Decision-Making Trial and Evaluation Laboratory (DEMATEL), fuzzy Analytical Hierarchical Process (FAHP), Analytical Network Process (ANP), the compromise ranking method (VIKOR), weighted sum model (WSM), weighted product model (WPM), Data Envelopment Analysis (DEA), Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE), the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), the quality function deployment (QFD) (Brans, 1982; Chen et al., 2019; Du et al., 2019; Fontela & Gabus, 1976; Hsu et al., 2020;; Lyu et al., 2020; Vincke & Brans, 1985). Various MCDM have been successfully applied to rank and evaluate complex factors in various knowledge disciplines such as selecting operating systems, supplier selection, tourism destinations, the software quality of vendors, and best technical institutions and universities (Çolak et al., 2020; Delissari et al., 2022; Goswami & Mitra, 2023; Yenugula et al., 2023). MCDM methods provide structured frameworks for decision-making through prioritising criteria, ranking alternatives and establishing preference relationships (Alghofaili & Rassam, 2022; Nguyen et al., 2021; Omerali & Kaya, 2022). One of the often used MCDM method across many disciplines is the FAHP first proposed by Saaty (1980, 1994). The FAHP helps consumers to evaluate and determine the priorities among different criteria, compare alternatives for each criterion and to establish an overall ranking of the alternatives (Agarwal, 2022; Cai et al., 2023; Hasan et al., 2020). The conceptual framework for this study has been developed using a hybrid technique that combines the FAHP and the TOPSIS MCDM. Multi-criteria decision making (MCDM) techniques such as the FHAP and TOPSIS have become popular in tourism studies in helping identify, rank and evaluate a set of alternative factors and destinations (Amaya & Lehlo, 2020; Khasanah et al., 2023; Kim et al., 2020; Law et al., 2020). The FAHP has been used widely in tourism planning by providing decision-makers with a problem solving framework by weighing criteria from pairwise comparison Joshi et al., 2020; Khan et

al., 2023; Kuma et al., 2022; Shan et al., 2023; Zhang & Zhang, 2023). The TOPSIS provides decision-makers with complementary avenues for choosing between alternatives (Anagnostopoulou et al., 2020; Ding et al., 2020; Eric et al., 2020).

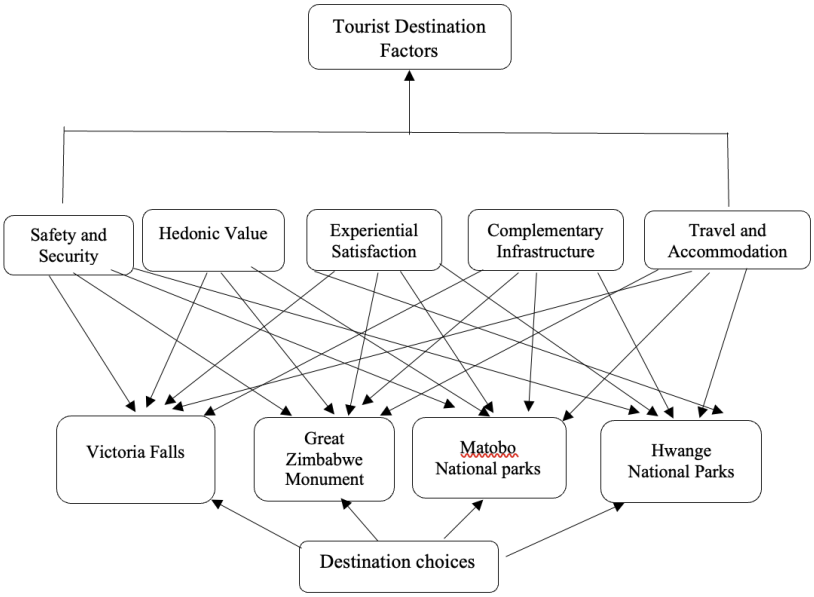

Figure 1: Conceptual framework
Source: Authors

Methods and material

The pull-push model of Plog (1974) was employed to select the five main tourist attraction destinations in Zimbabwe that is the Victoria Falls, Hwange National Park, Great Zimbabwe Ruins and the Matobo National Park. The destinations were purposively chosen given that they attract at least 90% of the tourists that visit Zimbabwe per year (Government of Zimbabwe, 2023). These options were evaluated using the following criteria, destination image, service attributes, price competitiveness, tourism support and experiential satisfaction and destination image. Destination image relates to attitudes towards tourism, richness of tourism products/services, natural and cultural heritage of the destination as well as the recreation and entertainment facilities in the destination (Daye et al., 2020; Ding et al., 2021). Service attributes relate to destination lifestyle, quality of restaurants, and freedom of language barriers and availability of other interesting places to visit (Chigora et al., 2020; Cortina et al., 2020; Otoo et al., 2021; Zhang & Zhang, 2020). Price competitiveness concerns entrance fees, inexpensive goods and lower travel and accommodation costs (Salee et al., 2022; Sari et al., 2021). Tourism support relates to sufficiency of accommodation facilities, safety of a destination and road, rail and air infrastructure (Amare, 2022; Kuma et al., 2022; Liro, 2021). Experiential satisfaction is concerned with recreational facilities, ability to immerse with local culture, the need to do repeat visits and core destination appeal (Khasanah, 2023; Law et al., 2020; Liu et al., 2023). Data were collected from five tourism experts that is tourists who have visited more than 10 countries and ten experts from transport, food and beverage, travel agents and tour operators, which are key segments of Zimbabwe tourism sector. These experts were asked to rank the tourists drivers using the weights shown in Table 1 below.

Table 1: Drivers of tourism

Criteria	Weight	Rating
Destination Image	4	10 very good-1 none
Service Attributes	2	10 very good-1 none
Price Competitiveness	6	10 very good-1 none
Tourism Support	8	10 low, 1 very high
Experiential Satisfaction	5	10 low, 1 very high

Source: Authors

Hybrid theoretical framework development: The FAHP

Following Saaty (1980), the following three procedures were adopted for FHAP. (i) The initial procedure was decomposing the decision problem into a three-level hierarchy. The first level of the hierarchy represented the overall goal of the decision problem that is, identifying and evaluating factors that influence consumers to purchase mobile smartphones. The second hierarchy which is the intermediate level represent the criteria affecting the decision whilst the last hierarchy depicts the bottom level and represents the possible alternatives. (ii) The second procedure was using pair-wise comparisons to compute the relative important weights of decision criteria in each level. To assess the priority score for each pair of criteria in the same level we used the fundamental scale or weights that ranged from 1 depicting equal importance and 9 indicating extreme importance. The pair-wise comparison matrix was constructed where elements a^{ij} inside the matrix is interpreted as the degree of the precedence of the *ith* criterion over the *jth* criterion. (iii) The last step involved evaluating the decision alternatives by

taking into account the weights of each decision alternative. The alternative scores were combined with criterion weights to come up with the overall score for each alternative. To convert linguistic judgements into triangular fuzzy numbers we adopted the following procedures. Let $S \in F(Z)$ be a fuzzy number if it exists $y_0 \in Z$ such that $\theta_S(y_0) = 1. B_\alpha = \langle y. \emptyset_{B\alpha}(y) \geq a \rangle$ is a closed interval for any $a \in \{0.1\}. F(Z)$ is representing all fuzzy number sets. S is the set of real numbers. A triangular fuzzy number is then represented as $Z = (l, c, u)$ if its membership function $\emptyset_S(y): Z \to [0.1]$ is equal to;

$$\emptyset_S y = \begin{cases} \frac{y}{c-1} - \frac{l}{c-1}, y \in [l, c] \\ \frac{y}{c-u} - \frac{u}{c-u}, y \in [c, u] \\ 0 \qquad\qquad \text{Otherwise} \end{cases} \qquad (1)$$

Where $l \leq s \leq y, l, y$ and s are lower, upper and middle-values of the support of S respectively. The support of S is the set of all elements $\{y \in Zil < \emptyset < y\}$. Let triangular fuzzy numbers Z_1, Z_3, Z_5, Z_7 and Z_9 represent the assessment from equally to extremely important and $Z_2, Z_4, Z_6,$ and Z_8 are the middle values. From priori studies we adopted the following triangular fuzzy score conversion.

Table 1: Triangular Fuzzy score conversion

Linguistic scale	TFNs	Reciprocal TFNs
Equally important	(1, 1, 1)	(1, 1, 1)
Weakly more important	(2/3, 1, 3/2)	(2/3. 1, 3/2)
Strong more important	(3/2, 2, 5/2)	(2/5, 1/2, 2/3)
Very strong more important	(5/2, 3, 7/2)	(2/7, 1/3, 2/5)
Absolutely more important	(7/2, 4, 9/2)	(2/9, ¼, 2/7)

Source: Authors

Letting Y=$\{y_1, y_2, y_3 \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots y_n\}$ be an object set and Y=$\{u_1, u_2, u_3 \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots u_n\}$ be an objective set. Each of the object is taken to execute extent analysis for each goal respectively. Then the s extent analysis values for each object can be discovered with the following signs.

$S_{g_i}^1, S_{g_i}^2, \ldots \ldots \ldots \ldots, S_{g_i}^s, where\ i = 1,2,3 \ldots \ldots n;$ (2)

Where $s_{g_i}^j = \{l_{g_i}^j, n_{g_i}^j, u_{g_i}^j\}, j = 1,2, \ldots \ldots \ldots \ldots \ldots . s$ are a set of triangular fuzzy numbers. The value of the fuzzy synthetic extend with respect to the i[th] object is expressed as;

$$R_i = \sum_{j=1}^n S_{g_i}^j \times \{\sum_{i=1}^n \sum_{j=1}^n S_{g_i}^j\}^{-1} \qquad (3)$$

$$\tilde{A} = \begin{bmatrix} 1 & \dot{\alpha}_{1\,2} \ldots . & \dot{\alpha}_{1n} \\ \dot{\alpha}_{21} & 1 \ldots . . & \dot{\alpha}_{2n} \\ \dot{\alpha}_{n1} & \dot{\alpha}_{n2} \ldots . & 1 \end{bmatrix} \qquad (4)$$

Where$\dot{\alpha}_{ij}$ is a fuzzy triangular number (FTN) and $\dot{\alpha}_{ij} = (l_{ij}, m_{ij}, u_{ij}$ ãij) and that, $\dot{\alpha}_{ij} = \frac{1}{\dot{\alpha}_{ij}}$. For every TFN $\dot{\alpha}_{ij}$ or M=(1,m,u), its membership function µâ 9x or µ M9X) is a continuous mapping from real numbers -∞ ≤ x ≤r ∞ to the closed interval (1.0) and can is defined by equation

µ0 (x) = $\begin{bmatrix} (x\text{-}l)\ (m\text{-}l), & l \leq x \leq m \\ (u\text{-}x) / (u\text{-}m), & m \leq x \leq u \\ 0, & \text{otherwise} \end{bmatrix}$ (6)

The operations on TFNs can take three forms that is multiplication, addition and inverse. For example if M_1 and M_2 are TFNs where M1= (M1= (l_1, m_1, u_1) and M_2= (l_2, m_2, u_2), then

Multiplication $m_1 x m_2 = (l_1 x l_2, m_1 x m_2, u_1 x u_2)$

Addition $m_1 + m_2 = (l_1 + l_2, m_1 + m_2, u_1 + u_2)$

Inverse $m_1^{-1} = (l_1 x m_1 x u_1)^{-1} = (\frac{1}{u_1}, \frac{1}{m_1}, \frac{1}{l_1})$

The third stage was aggregating the group decisions where after collecting matrices from all decision makers there are the aggregated using fuzzy geometric method proposed by Buckley (1985). In a certain case $\hat{u}_{ij} = (l_{ij}, m_{ij}, u_{ij})$, the aggregated TFN of *n* judgements made by decision makers is given by

$$\hat{u}_{ij} = (\prod_{i=1}^{n} \hat{a}_{ijk})^{1/n} \quad (7)$$

Where $\hat{a}_{ijk}$ represents the relative importance in the form of TFN of the *kth* decision maker's perception and, n is the total number of decision makers. On the basis of the aggregated pair wise comparison matrix, $\tilde{U}=(\tilde{u}_{ij})$, the value of fuzzy synthetic extent S_i with respect to the ith criterion was computed by making use of the algebraic operations on TFNs described above, as follows;

$$S_i = \sum_{j=1}^{n} \tilde{u}_{ij} \, x (\sum_{i=j}^{n} \sum_{j=1}^{m} \tilde{u}_g)^{-1} \quad (8)$$

Where $\sum_{j=1}^{m} \tilde{u}_{ij} = (\sum_{j=1}^{m} l_j , \sum_{j=1}^{m} m_j \sum_{j=1}^{m} u_j \; and$

$$\sum_{i=1}^{n} \sum_{j=1}^{m} \tilde{u}_{ij} = \sum_{l=1}^{n} \tilde{u}_{ij} \sum_{l=1}^{n} m_j \sum_{l=1}^{n} u_i \quad (9)$$

Relying on the fuzzy synthetic extent values, the non-fuzzy values that represent the relative weight or preference of one criterion over others are required. Adopting Chang (1996) to find the degree of possibility that $S_b > S_a$ is given as follows.

$$V(S_b > S_a) = \begin{cases} 1 & \text{, if } M_b \geq M_a \\ 0 & \text{, if } L_a \geq U_b \\ L_a\text{-}U_b / (m_b\text{-}u_b)\text{-}(m_a\text{-}l_a) & \text{, otherwise} \end{cases}$$

Where *b* is the ordinate of the highest intersection between uS_a and uS_b. For the degree of possibility for a TFN S_i to be greater than the number of *n* TFNs (Dubois and Prade, 1980). The degree of possibility of $S_1 \geq S_2$ is expressed as in equation 10

$$V\{S_1 \geq S_2\} = (sup|min)\{u_{S_1(x)}\}, u_{S_2}(y)), \quad (10)$$

Where $y \geq p$

When a pair (x, y) exists such that $x \geq y$ and $u_{M_1}(x) = u_{M_2}(y) = 1$, then $V(R_1 \geq R) = 1, iff \; c_1 \geq c_2$ If $c_1 \geq c_2, V(S_1 \geq S_2) = hgt\{S_1 \cap S_2\}$, then

$$V(S_1 \geq S_2) = \left\{\frac{l_2 - u_1}{(c_1 - u_2) = (c_2 - l_2)}\right\}^{'l_2} \leq u_2, otherwise \quad (11)$$

The degree of possibility for a triangular fuzzy number that is greater than *K* triangular fuzzy number $S_1 (i = 1,2,3 \dots \dots \dots \dots \dots \dots \dots \dots k)$ can be expressed as $V(S \geq S_1, S_2, \dots \dots S_k) = min \, V(S \geq S_1$ Assume that $d'(A_t) = minV(S_t \geq S_k)$ where d' is the abscissa of the highest intersection point between B_1 and B_2 and *A*t is the ith element of the kth level for $k = 1,2, \dots . n; k \neq i$. The weight vector of the kth level is $W' = (d'(B_1), d'(B_2), d'(B_n))^T$. The normalised weight vector is then obtained by normalization as in equation 12

$$W = (d(B_1), d(B_2), \dots . d(B_n))^T \quad (12)$$

Where *W* is not a fuzzy number. After evaluating the weights of the criterial, the scores of the alternatives with regards to each criterion were computed and later also calculated the composite weights of the decision alternatives by aggregating the weights through a hierarchy.

The TOPSIS

The underlying principle of TOPSIS is that the preferred solution of alternatives should have the shortest distance towards the ideal positive solution and the furthest distance from the ideal negative solution (Bire et al., 2021a; Carneiro et al., 2018; Xue et al., 2023). Accordingly, the preferred solution is comprised of all the best indices. TOPSIS is preferable as it is mathematically simple yet is largely flexible in the choice set. The first step was to carry out vector normalisation using equation 12 above. Each performance rating was divided by its norm where the normalised rating $y_{ij} (i = 1,2,3 \dots I; j = 1,2,3 \dots , J)$ was computed using equation (4)

$$y_{ij} = {x_{ij}}\Big/{\sqrt{\sum_{i=1}^{I} {x_{ij}}^2}} \quad (13)$$

The reason for the conversion process was to make comparison across attributes simpler with dimensionless units. The normalised performance ratings Y_{ij} is shown in equation 5

$$Y = \begin{bmatrix} Y_{11} & Y_{12} & Y_{1j} \\ Y_{21} & Y_{22} & Y_{2}j \\ \ldots. & \ldots. & \ldots. \\ Y_{I1} & Y_{I2} \ldots & Y_{Ij)} \end{bmatrix} \quad (14)$$

The second stage is integrating weights with ratings using equation 1 and 5 to form a weighted normalised decision matrix as in equation 6 and 7 (see Table 2 and appendices)

$$v_{ij} = W_j * y_{ij}; (i = 1,2,3 \ldots, I; j = 1.2.3 \ldots., J) \quad (15)$$

$$V = \begin{bmatrix} v_{11} & v_{12} & v_{1j} \\ v_{21} & v_{22} & v_{2}j \\ \ldots. & \ldots. & \ldots. \\ v_{I1} & v_{I2} \ldots & v_{Ij)} \end{bmatrix} \quad (16)$$

The third stage was finding the negative solution denoted by A^n and positive ideal solution represented by A^p as per equations 8 and 9 (Wang et al., 2022; Llamazares, 2019; Chede et al., 2021)

$$A^p = (v_1^*, v_{2,}^* v_3^*) \quad (17)$$

$$A^n = (v_1^n, v_{2,}^n v_3^n) \quad (18)$$

Where

$$v_j^p = \begin{pmatrix} maxv_{ij}, if\ j\ is\ a\ benefit\ attribute \\ maxv_{ij},\ \ if\ j\ is\ a\ cost\ attribute \end{pmatrix} \quad (19)$$

$$v_j^n = \begin{pmatrix} maxv_{ij}, if\ j\ is\ a\ benefit\ attribute \\ maxv_{ij},\ \ if\ j\ is\ a\ cost\ attribute \end{pmatrix} \quad (20)$$

The decision on the order of options was made according to order of numbers using equation 21

$$D^* = \frac{d(A_i, A^\circ)}{d(A_i, A^*) + d(A_i, A^\circ)} = \frac{1}{\frac{d(A_i, A^*)}{d(A_i, A^\circ)} + 1} \quad (21)$$

The option A_{i1} is the best solution if $\max(D_{1,}^* D_{2,}^* D_3^* \ldots\ldots D_m^*) = D_{i_1}^*$ and the option Ai_2 is the worst solution if $\max(D_{1,}^* D_{2,}^* D_3^* \ldots\ldots D_m^*) = D_{i_2}^*$ and the other options are within these two extremes. The maximum distance given by $D^* = maximum_{i=1} \ldots\ldots m D_i^*$ is also known as the TOPSIS metric. In the fourth stage we applied the Euclidean distance theory to obtain the separation of values which is the distance of each alternative rating from both the negative and positive ideal solutions, equations 22 and 23 (Table 3)

$$S_i^p = \sqrt{\sum_{j=1}^{J} (v_{ij} - v_j^*)} \quad (22)$$

$$S_i^n = \sqrt{\sum_{j=1}^{J} (v_{ij} - v_j^n)} \quad (23)$$

The last stage is getting the overall preference score V_i for each alternative A_i using equation 24

$$V_i = {S^n}\Big/{S^P} \quad (24)$$

Findings and discussions

Table 2 shows weighted standardised decision matrices and these help to make better decisions based on objective facts rather than subjective opinions. In unweighted or normal ranking, all the weights have equal importance. However, using table 2 it can be deduced that Victoria Falls has the highest weights suggesting that based on the given criteria the decision to visit Zimbabwe is largely influenced by the Victoria Falls followed by the Great Zimbabwe Monuments respectively. The results point to a dominant factor that is destination image (6.00) followed by price competitiveness (4.23), experiential satisfaction (3.88) and tourism support (2.44) respectively. Similar findings are recognised in many studies where destination image has been reported to motivate most tourists (Amare, 2022; Egger et al., 2022; Eslami et al., 2020; Chigora et al., 2019). Service attributes is ranked lowest (1.31) suggesting that most tourists do not consider issues of language barrier, destination life style and availability of complementary activities as necessary in order to visit the Victoria Falls. However tourism support was found to be important for destinations like Hwange National Park and Great Zimbabwe.

Table 2: Weighted standardised decision matrix

Criteria	Hwange National Parks	Matobo National Parks	Victoria Falls	Great Zimbabwe Ruins
Destination Image	1.72	1.39	6.00	2.27
Service Attributes	1.03	0.77	1.31	0.80
Price Competitiveness	2.54	1.69	4.23	2.96
Tourism Support	3.32	2.04	2.44	3.58
Experiential satisfaction	2.01	1.36	3.88	2.01

Source own

Results for destination competitiveness are shown in Table 3. Table 3 demonstrates that visitors to Zimbabwe are hugely influenced by the Victoria Falls (1.00) followed by Hwange National Parks (0.83) and Matobo National Parks (0.68). Great Zimbabwe is the last in the ranking of attractive destinations (0.00). All the rankings are based on the following criteria; destination image, service attributes, price competitiveness, tourism support and experiential satisfaction. The emergence of the Victoria Falls (1.00) as a top destination is hardly surprising considering that it is one of the seven natural wonders in the World and the only one in Africa (UNESCO, 1989). It is twice as wide and deep as the famous Niagara Falls in the United States and offers sanctuary to the big five animals (GoZ, 2022; Chigora et al., 2020). Hwange National Parks (0.83) is ranked the second and is home to the big five (GoZ, 2023). A number of studies show that visitors to Hwange National Park are often beguiled by many service attributes such as opportunities for enthralling adventures, hiking in cascading natural landscapes, and numerous complementary outdoor activities (Mutambara et al., 2023; Chigora et al., 2019). Matobo National Park (0.68) ranked third and this findings is also not surprising since it is considered a sacred shrine by local communities. To a nonchalant visitor, inimitable and idiosyncratic features of the Matobo Hills sandwiched within the park offers opportunities for cultural immersion and wilderness (Mutambara and Muzurura, 2023). Motives for visiting shrines and sacred places are widely ventilated in empirical literature and include; spirituality growth (Bond et al., 2015), searching for life experiences (Nyaupane et al., 2015), request for a miracle (Musa et al., 2017), atonement for a sin committed (Norman, 2012), uncovering oneself, devotion, spiritual self-enrichment, faith, piety, religious affiliation and acquiring healing power (Lee et al., 2015; Cheng and Chen, 2014).

Table 3: Closeness to ideal solution

	Hwange National Parks	Victoria Falls	Great Zimbabwe	Matobo National Park
S*	7.07	14.91	0.00	5.63
S**	1.48	0.00	14.95	2.59
S*+S**	8.55	14.91	14.95	8.22
S*/(S*+S**)	0.83(C^*_1)	1.**00 (C^*_2)**	0.00 **(C^*_3)**	0.68 **(C^*_4)**

closeness to the ideal solution C

Source: Author

Conclusion, implications, and recommendations

The research investigated and evaluated factors that drive tourists to visit five main destinations in Zimbabwe. The destinations were ranked according to destination image, tourism support, price competitiveness, experiential satisfaction and service attributes. Our findings show that Victoria Falls and Hwange National Park were top destinations chosen for their destination image, price competitiveness, tourists' support and experiential satisfaction. Our contribution to literature is developing a hybrid multi-criteria decision-making technique in the form of FAHP-TOPSIS framework that prioritises factors that motivate tourists to visit destinations in Zimbabwe. In terms of implications and recommendations, for tourism to have a meaningful contribution to national development the focus must be on improving sustainability of local communities in terms of mitigating poverty, and improving food security resilience. In this regard, the government should ensure that a significant portion of tourism receipts are channelled back to local communities and local communities must not be merely recipients but should play a prominent role in shaping strategies to attract tourists to their regions. Government incentives for developing locally owned accommodation (homestays) and integrating local foods in restaurants can help to promote destination image, improve tourism support and in turn tourists' experiential satisfaction. Channelling tourist receipts to improve local infrastructure such as roads, schools, hospitals and social services should help to encourage community-based tourism initiatives.

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