KEY DETERMINANTS OF VETERINARY CLINIC LOCATION: AN EXPLORATORY STUDY

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ABSTRACT

The strategic placement of veterinary clinics is decisive for effective animal healthcare. This study employs Structural Equation Modelling (SEM) to assess key determinants of veterinary clinic location, including People Perspective, Skill & Technology, Basic Amenities, Medical Facilities, and Hospital Location Attributes, using data from 150 veterinary doctors. Findings show Skill & Technology as the most influential factor, providing critical insights for strategic location planning and informed decision-making in veterinary clinic development.

Keywords: Veterinary clinic location,People Perspective, Skill & Technology, Basic Amenities, Medical Facilities, and Hospital Location Attributes

INTRODUCTION

The veterinary sector is currently undergoing significant and complex changes that are impacting its competitive landscape. The number of pet healthcare providers is on the rise (Lowe, 2009), while rural areas are experiencing a decline in veterinary service providers (Jensen et al., 2009; Villarroel et al., 2009). Selecting an optimal location for a veterinary hospital is a multifaceted and strategic decision involving plentiful factors. Unlike general healthcare facilities, veterinary hospitals must cater to both pet owners' accessibility and the specialized needs of animal care. This decision integrates multi-criteria considerations, including demographic data, proximity to other veterinary services, transportation links, zoning regulations, and competitive landscape. Understanding and evaluating these criteria is essential to ensure operational success of the hospital and the well-being of animal patients and

satisfaction of their owners. This study purports to explore the critical factors and methods for effective veterinary hospital location selection, providing insights for decision-makers in the field. By engaging data-driven approaches and expert input, the findings offer anall-inclusive framework to guide strategic site selection that aligns with both medical and business objectives.

Optimal hospital site selection is decisive for investors and operators, as it greatly influences cost-saving strategies and capital management. Strategic site selection enhances branding, marketing, differentiation, and human resource strategies, strengthening overall competitiveness. However, hospital location decisions are complicated and impact various societal aspects. Diverse opinions and debates on prioritizing criteria can create confusion, even among healthcare experts (Sen, 2017). Multi-Criteria Decision Making (MCDM) is a critical branch of decision theory used to identify the optimal solution among various alternatives. The Analytic Hierarchy Process (AHP) is a widely recognized MCDM method that has garnered significant traction across industries, including construction, over the past two decades. Choosing a suitable site for a hospital project is an essential first step in initiating such a venture (2018).Veterinary clinics in India are spread across urban and rural areas, catering to diverse needs.

LITERATURE REVIEW

Farahani et al. (2010) reviewed multi-criteria location problems, noting the need for updated, in-depth analyses. Sipahi and Timor (2010) detailed AHP and ANP's role in MCDM. Lin and Tsai (2010) combined ANP and TOPSIS for hospital site selection in China, demonstrating a practical MCDM model. Eldemir and Onden (2016) combined AHP and GIS for location selection in Istanbul, demonstrating effectiveness in spatial analysis.

Ahmadi Javid et al. (2017) underscored the strategic importance of healthcare facility (HCF) location within healthcare systems and disaster management, presenting a comprehensive classification framework for HCFs and revealing research gaps. Rahimi et al. (2017) focused on optimal hospital location planning in Shiraz, emphasizing GIS-based site assessment.

Kahraman et al. (2019) advanced fuzzy TOPSIS for hospital location, enhancing decision-making through expert input. Pınar and Antmen (2019) emphasized MCDM’s critical role in

healthcare facility planning. Gul and Guneri (2021) conducted a PRISMA-based review of hospital site selection studies, categorizing methods and criteria in MCDM contexts.

Alkan and Kahraman (2022) introduced circular intuitionistic fuzzy sets (CIFS) in a CIF-TOPSIS model for pandemic hospital site selection, showcasing comparative and sensitivity analyses. Barutcu and Ic (2022) utilized a VIKOR-based model for post-earthquake hospital site selection in Ankara, adaptable for global use. actors Influencing Location Choices

Several factors influence the location of veterinary clinics:Economic Feasibility: Clinics are often situated where the business model supports profitability, typically in higher-income urban areas (Smith et al., 2014).Animal Demographics: The presence of a significant pet or livestock population encourages the establishment of clinics (Zhao & MacDonald, 2019).Accessibility and Infrastructure: The availability of roads, transport systems, and other infrastructure plays a crucial role in determining location (Goyal et al., 2020).Regulatory and Policy Environment: Government policies, such as incentives for rural veterinary clinics, also impact location decisions (AVMA, 2013).

RESEARCH METHODOLOGY

3.1 Research Objectives

The primary objective of this study is to examine the key factors influencing the strategic location of veterinary clinics. Specifically, it aims to assess the impact of People Perspective, Skill & Technology, Basic Amenities, Medical Facilities, and Hospital Location Attributes on clinic placement decisions. The study also seeks to provide valuable insights to assist veterinary service providers in optimizing clinic locations to improve accessibility, service delivery, and client satisfaction.

3.2 Hypotheses

These hypotheses aim to explore the relationships between various factors and their role in determining the strategic placement of veterinary clinics.

H1: People Perspective has a significant positive impact on the strategic location of veterinary clinics.

H2: Skill & Technology has a significant positive impact on the strategic location of veterinary clinics.

H3: Basic Amenities have a significant positive impact on the strategic location of veterinary clinics.

H4: Medical Facilities have a significant positive impact on the strategic location of veterinary clinics.

H5: Hospital Location Attributes (e.g., proximity, infrastructure) have a significant positive impact on the strategic location of veterinary clinics.

H6: People Perspective significantly influences Skill & Technology in the context of veterinary clinic location decisions.

H7: Skill & Technology significantly influences Hospital Location Attributes in the context of veterinary clinic location decisions.

H8: Basic Amenities significantly influence Hospital Location Attributes in the context of veterinary clinic location decisions.

H9: People Perspective significantly influences Basic Amenities in the context of veterinary clinic location decisions.

H10: Medical Facilities significantly influence Hospital Location Attributes in the context of veterinary clinic location decisions.

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3.3 Research design

The research design for veterinary clinic location selection incorporates a survey method to gather primary data. Exploratory research in veterinary site selection is conducted to identify and clarify the key issues and variables that need to be considered when selecting the most appropriate site for veterinary services.

3.4 Questionnaire Design - Factors, Constructs and scales

The initial set of scale items was generated based on insights from existing literature. In order to ensure content validity, the items used for the constructs in this study were mostly adapted from prior studies. Two industry experts and two academic experts and two research scholars assessed the content and face validity of the survey measures and the items. Thus, a questionnaire was constructed and pre-tested before a group of 15 respondents. Thereafter, sampling procedure, methods of data collection and analysis were determined

3.5 Sampling Data Collection:

Pilot survey was conducted and refined. Primary data, was be gathered using questionnaires, systematic sampling was chosen. Sample size was 150 observations from veterinary doctors

3.6 Statistical Tools Used

Tools used to evaluate instrument

Reliability and validity tests are important to standardise the measurement scales, and to demonstrate whether they truly measure what they are supposed to measure.

Reliability Test

Cronbach's alpha is a measure of internal consistency, it is a coefficient of reliability that is, how closely related a set of items are as a group. A "high" value of alpha is often used substantive as evidence that the items measure an underlying (or latent) construct. Nunnally (1978) recommend that ideally a minimum level of 0.7 for Cronbach alpha coefficient be used as a cut-off in scale reliability determination

Table 1:Reliability – Cronbachs Alpha Results

Construct	Item	Inter Item Alpha	Cronbachs Alpha
People Perspective	Pet Population People Interest towards Animals Purchasing Power	.842 .798 .821	.815
Skill and Technology	Doctor Expertise, Sound Technology Availability of Skilled LabourTeam Work Availability of technology	.878 .891 .799	.835
Basic Amenities	Availability of space Availability of Water Availability of Electricity	.812 .831 .880	. .841

Medical Facilities	Availability of Lab Facilities Availability of Xray, Ultra sound & ECG in the location Availability of Medicines & Consumables	.753 .782 .734	.776
Hospital Location Attributes	Commercial or residential area Nearby veterinary Clinic Political Aspects Safe Neighbourhood Economic Aspects Sensitivity	.721 .715 .719 .802 .709	.731
Vet Clinic Location	Intention to Stay	.721	.721

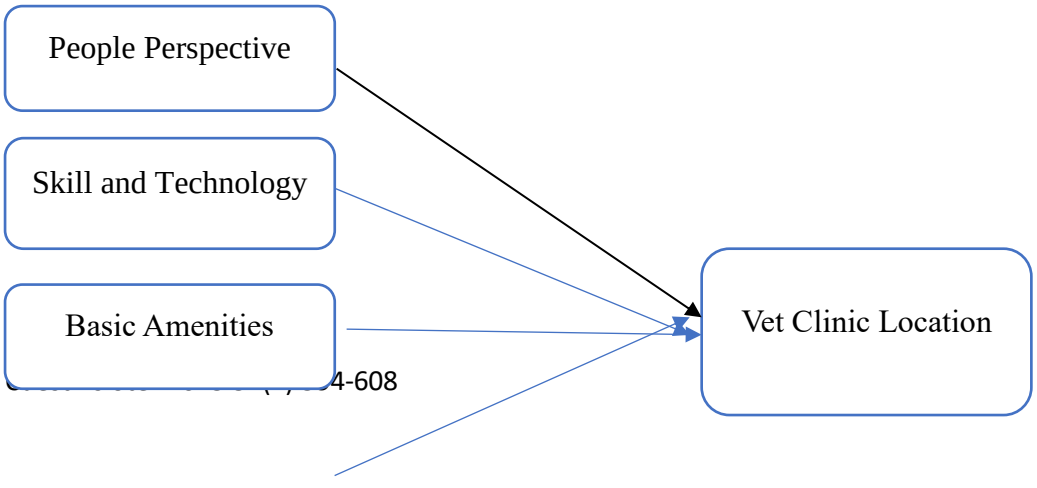
Validity Test

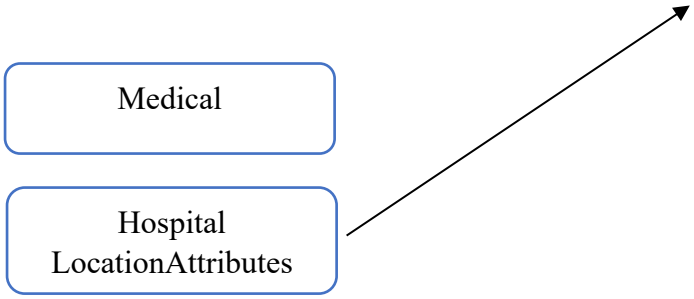
An empirical measure is valid if it actually measures what it claims to measure (Cronbach &Meehl, 1955).

Using SEM and Factor Analysis for Veterinary Hospital Location Selection:

Structural Equation Modeling (SEM) and Factor Analysis were used to assess the factors influencing veterinary hospital location selection. SEM helps analyze direct and indirect relationships among variables such as people perspective, skill and technology, basic amenities, medical facilities, and hospital location attributes. These tools provide insights into the complex interactions shaping optimal clinic location decisions.

Figure 1 Factors Affecting Choice of Vet Clinic Location





To assess the reliability and validity of the proposed constructs in this study confirmatory factor analysis was adopted.

In order to carry out the above-mentioned statistical techniques, two statistical softwares were used. SPSS 11.0 and AMOS 6.0 were used to carry out statistical analysis. Multiple regression was run on SPSS 11.0 and Structural Equation Modeling (SEM) was carried out in AMOS 6.0.

Validity Analysis of Measurement model

Confirmatory Factor Analysis (CFA) was conducted to assess the validity of the constructs and their measurement scales. The model fit indices were within acceptable limits ($\chi 2 = 954.960$, $p < .000$, CFI = 0.863, RMSEA = 0.90). Convergent validity was confirmed as standardized factor loadings for all items were significant ($p < 0.001$) and exceeded 0.60, ensuring reliable measurement of constructs.

Table 2 Measurement Model Indices for Study IV

CONSTRUCT	ITEMS	ESTIMATE
People Perspective	Pet Population	.792
	People Interests towards Animals	.743
	Purchasing Power of consumer in the region	.720

Skill and Technology	Doctor Expertise &Sound Technology Availability of Lab facility in the Location Availability of Xray, Ultrasound & ECG in the location Availability of technology Availability of Skilled Labour	.805 .715 .933 .901 .756
Basic Amenities	Availability of space for parking Availability of Water location Availability in EB location Availability of Transportation	.806 .712 .726 .633
Medical Facilities	Availability of Medicines & Consumables Availability of Lab Facilities Availability of Xray, Ultra sound & ECG in the location	.723 .764 .764
Hospital Location Attributes	Commercial or residential area Nearby veterinary Clinic Political Aspects EconomicAspects Safe Neighbourhood	.781 .728 .683 .757 .698
Vet Clinic Location	Intention to Choose Location	.756

Degrees of Freedom = 220 , Chi-square/df = 2.482, CFI = 0.863, and RMSEA= 0.90, NFI = .829 RFI = .804 IFI = .863 TLI = .842 GFI= .830

SEM Analysis

The Structural Equation Modelling (SEM) approach was employed to validate the research model, chosen for its ability to test causal relationships among constructs with multiple measurement items and assess the measurement characteristics of constructs. Using Amos 16.0, observed endogenous variables included Pet Population, People Interest, Purchasing Power, Doctor Expertise, Availability of Skilled Labour, Technology, and Facilities, while unobserved endogenous variables were People Perspective, Skill & Technology, Basic Amenities, Medical Facilities, and Hospital Location Attributes. The chi-square test and fit indices confirmed model adequacy. With Chi-Square = 745.449, df = 211, Chi-Square/Df = 3.532, RMSEA = 0.079, GFI = 0.867, and CFI = 0.900, the model adequately represents the causal relationships and demonstrates strong fit to the data.

Table 3 gives the overall results of hypotheses results for existing employee data. Each section of this SEM analysis has been structured in the following manner. The hypothesis highlighting the impact of People Perspective, Skill & Technology, Basic Amenities, Medical Facilities, Hospital Location Attributes employer branding on Vet Clinic Location is well supported. well supported in the SEM results.

The analysis indicates that all hypothesized relationships were significant, suggesting that multiple factors contribute to the optimal location of veterinary clinics:

People Perspective → Clinic Location:

Significance: This relationship, with a standardized regression weight of .218 and a CR of 3.524, suggests that community perceptions and preferences play a notable role in the success of a veterinary clinic's location. Factors like convenience, trust in services, and the reputation of the clinic could be influencing this outcome.

Implication: Understanding the community's expectations is crucial for the strategic placement of veterinary services.

Skill & Technology → Clinic Location:

Significance: This relationship, the strongest with a standardized regression weight of .564 and a CR of 4.546, highlights the importance of skilled personnel and technological infrastructure in determining clinic location. Clinics that incorporate advanced diagnostic tools and skilled veterinary professionals are more likely to thrive.

Implication: Investment in training and technology should be a priority when planning clinic locations to attract clients and ensure quality service.

Basic Amenities → Clinic Location:

Significance: With a regression weight of .143 and a CR of 3.347, this indicates that access to essential amenities (e.g., waiting areas, hygiene facilities) significantly impacts the choice of location.

Table 3: Structural Equation Modelling Results

Implication: Proper planning should ensure that clinics are equipped with basic facilities to enhance client satisfaction and service delivery.

Medical Facilities → Clinic Location:

Significance: The relatively lower weight (.049) and CR (3.368) still affirm that the availability of comprehensive medical facilities is relevant for a clinic's location. However, the smaller impact size suggests that while essential, it might not be the primary driving factor.

Implication: Clinics should balance their focus on advanced medical facilities alongside other factors such as accessibility and client-centric services.

Hospital Location Attributes → Clinic Location:

Significance: The strong relationship (standardized weight of 1.15 and CR of 1.164) indicates that specific location attributes such as proximity to urban centers, ease of access, and surrounding infrastructure are pivotal.

Hy. No	Hypotheses	Standardized Regression Weights	CR	Results
1	People Perspective → Clinic Location	.218	3.524	**YES**
2	Skill & Technology → Clinic Location	.564	4.546	**YES**
3	Basic Amenities → Clinic Location	.143	3.347	**YES**
4	Medical Facilities → Clinic Location	.049	3.368	**YES**
5	Hospital Location Attributes → Clinic Location	1.15	1.164	**YES**
6	People Perspective → Skill & Technology	.049	.633	**YES**
7	People Perspectives → Hospital Location Attributes	.043	1.001	**YES**
8	People Perspectives Technology → Basic Amenities	.130	1.962	YES
9	Basic Amenities → Hospital Location Attributes	.217	3.915	**YES**
10	Medical Facilities → Hospital Location Attributes	.062	1.131	**YES**
Fit Indexes: RMSEA - .079, RMR- .018, GFI-.867, and CFI-. 900, IFI - .901, Chi-square = 745.449, Degrees of freedom = 211, Chi-Square /Df = 3.532, Probability level = .000				

Implication: Strategic placement in well-connected areas can improve clinic visibility and attract more clients.

Other Relationships:

People Perspective → Skill & Technology and People Perspective → Hospital Location Attributes highlight the interconnected nature of community perceptions, skills, and location attributes. The moderate regression weights underscore the need for an integrated approach when assessing clinic locations.

CONCLUSION:

By using **SEM** and **Factor Analysis**, veterinary hospital owners can make more informed decisions when selecting a location. These methods allow for a comprehensive analysis of complex, interrelated factors, providing insights that are difficult to achieve with traditional methods. With the ability to model direct and indirect relationships, these techniques ensure that decisions are based on solid data, leading to more successful site selection outcomes. By integrating these approaches, decision-makers can systematically assess the trade-offs between different site options, balancing the competing priorities and ultimately making a well-informed decision that best aligns with the needs of the veterinary service, the community, and stakeholders.

The empirical results of supported the facts that basic amenities promote hospital location attributes, medical facilities and people's perspective. Likewise, medical facilities, skill and technology hold hospital location attributes. In line with the literature, survey results supported the fact that hospital location attributes encouraged choice of vet clinic location. According to the gained primary data results in the research, it was found that the key factors, influencing the choice of veterinary clinic location are as follows: the service quality of healthcare which includes skill and technology, medical facilities and basic amenities, the people perspective and hospital location attributes.

Choosing the perfect location for your veterinary clinic requires careful consideration of various factors, including understanding your target market, assessing competition, evaluating accessibility and visibility, considering zoning and permitting requirements, analysing the potential client base, proximity to referral partners and emergency services, facility

requirements, cost and return on investment, access to supportive services, and engaging with the local community.

Suggestions for Future Reseach

Future studies should explore the unique challenges and drivers for establishing veterinary clinics in rural and semi-urban areas, where accessibility and community needs differ. This study does not extensively address how local economic conditions, subsidies, or governmental policies affect the location of veterinary clinics. Research should focus on the longitudinal impact of evolving technologies on clinic location strategies. Future research could integrate demographic analyses to assess which areas may experience increased demand for clinics. The current findings emphasize individual relationships but do not capture a full multi-faceted service analysis, such as emergency services versus routine care. The results focus on initial factors influencing location but do not examine post-establishment outcomes like client retention and satisfaction.

The SEM results confirm that factors such as people perspective, skill and technology, basic amenities, medical facilities, and hospital location attributes significantly influence the placement of veterinary clinics. Addressing the highlighted research gaps can provide a deeper, more nuanced understanding of the factors shaping clinic location strategies and their long-term success. Advancements in telemedicine have begun to address some of the challenges associated with clinic locations. Telehealth services allow veterinarians to offer consultations and basic care remotely, which has proven beneficial for rural areas with limited physical clinic access (Brown & Harris, 2022). The integration of digital solutions with traditional veterinary practices is expected to reshape how services are distributed geographically.

The location of veterinary clinics plays a pivotal role in ensuring animal welfare and supporting public health. While urban areas continue to experience growth in veterinary service providers, rural regions remain underserved. Strategic measures, including government policies, economic incentives, and the adoption of telemedicine, are essential to bridging the service gap and ensuring equitable access to veterinary care. This review highlights the need for continued research and policy efforts to balance the distribution of veterinary services across urban and rural areas, with a focus on improving infrastructure, workforce distribution, and technological integration.

In conclusion, this study highlights the critical factors influencing the strategic selection of veterinary clinic locations using Structural Equation Modeling (SEM). The analysis reveals that key determinants such as People Perspective, Skill & Technology, Basic Amenities, Medical Facilities, and Hospital Location Attributes significantly impact the decision-making process. Among these, Skill & Technology emerged as the most influential factor, emphasizing the importance of having skilled professionals and advanced technology in veterinary services. Hospital Location Attributes, including accessibility, proximity, and infrastructure, were also found to be crucial for clinic success. The findings of this research provide valuable insights for veterinary service providers and policymakers, assisting them in making informed decisions about clinic placements. Furthermore, the study underscores the importance of aligning clinic locations with community needs and expectations, ensuring the accessibility, sustainability, and success of veterinary practices. Future research can explore rural and urban differences to enhance the applicability of the findings.

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