



Determinants of visitor motivation in science museums: A focus on Visvesvaraya Industrial and Technological Museum

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Abstract

A museum is an institution that cares for conservation and preservation of a collection of artefacts and other objects of scientific, artistic, cultural, or historical importance and makes them available for public viewing through exhibits that may be permanent or temporary (Phelan, S., *et al* 2020) [7]. Museums not only conserve or preserve the rich heritage of a region but also provide education on past lives and opportunities for future research. The science and technological museums in India under NCSM – National Council of Science Museums are the treasure houses of such scientific collections and providing scientific education to its visitors. This study examines the factors influencing visitor motivation at the Visvesvaraya Industrial and Technological Museum (VITM), Bengaluru. Science museums have evolved from static display spaces into dynamic learning environments, emphasizing engagement through interactivity. The primary objective of this research is to identify the major motives behind visitation to one such science museum that is VITM, Bengaluru.

A primary survey was conducted using a structured questionnaire, and 312 valid responses were collected from visitors at VITM. The data were analyzed using descriptive statistics and comparative analysis to understand visitor motivations and preferences. The findings reveal that Education, Curiosity, Tourism and Leisure are the dominant motives. The study also reveals that the particular segment of visitor and their motive are directly linked. Interactive exhibits were found to significantly enhance visitor engagement, satisfaction, and learning outcomes.

The study contributes to the growing body of literature on museum studies and special interest tourism by highlighting the importance of interactivity in attracting diverse visitor segments. It helps museum authorities to know, why visitors are coming to museums? what they are looking for? It offers practical implications for museum management in designing exhibits that cater to multiple visitor motivations.

Keywords: Science museum, interactive exhibits, visitor's motive, education, curiosity

Introduction

Science museums play a crucial role in promoting scientific awareness, education, and innovation in society. Traditionally, museums were perceived as repositories of artifacts and knowledge; however, modern science museums have transformed into interactive spaces that foster experiential learning. The integration of interactive exhibits has significantly enhanced visitor engagement, making museums more attractive to a wider audience.

The Visvesvaraya Industrial and Technological Museum (VITM) in Bengaluru is one of India's premier science museums, attracting students, families, and tourists. Named after Sir M. Visvesvaraya, the museum aims to inspire interest in science and technology through hands-on exhibits and demonstrations. Over the years, VITM has incorporated interactive displays that encourage active participation, making learning both enjoyable and meaningful. VITM has several galleries related to science and Technology.

Visitor motivation is a critical aspect of tourism and museum studies. Understanding why people visit museums helps in designing better exhibits and improving visitor experience. In the context of science museums, motivations can broadly be categorized into education, leisure, tourism, and curiosity. Interactive exhibits are believed to influence these motivations by providing immersive and engaging experiences. Engine Hall, BEL-Hall of Electronics, Electro-technic Gallery, Fun Science, Science for Kids, Space Gallery, Dinosaur Enclave, Science on a Sphere, Wright Brothers Aero plane, Mind Over Matter – A Tribute to

Stephen Hawking, Seeds of Culture are the major galleries and new galleries are under development by the innovation team.

This study aims to analyze the major motives behind visitation to VITM and evaluate the effectiveness of interactive exhibits in enhancing visitor attraction. The research addresses the following objectives:

1. To identify the primary motivations of visitors visiting VITM, Bengaluru
2. To assess the role of interactive exhibits in influencing visitor motivation.
3. To analyze visitor's preferential activities during the visit.

Literature Review

The concept of interactive exhibits has gained prominence in museum studies, particularly in science museums. Falk and Dierking (2013) emphasized the importance of visitor-centered experiences, suggesting that museums should focus on engagement rather than passive observation. Interactive exhibits enable visitors to actively participate in the learning process, thereby enhancing knowledge retention and satisfaction.

Hooper-Greenhill (2007) highlighted the shift from object-based to experience-based museums, where interactivity plays a key role in attracting diverse audiences. The author argued that modern museums must cater to different learning styles and preferences, making interactive exhibits essential.

In the context of tourism, science museums are increasingly recognized as important attractions under Special Interest Tourism (SIT). According to Richards (2018), tourists seek meaningful and educational experiences, and science museums fulfill this demand through interactive and informative displays.

Studies conducted in India have also emphasized the role of science museums in promoting education and tourism. Interactive exhibits have been found to enhance visitor engagement, particularly among students and young audiences. Research indicates that curiosity-driven learning is a significant factor influencing museum visits.

Visitor motivation has been widely studied in tourism research. Iso-Ahola (1982) identified escape and seeking as key motivational dimensions, which can be applied to museum visits. Education and curiosity align with the seeking dimension, while leisure represents the escape aspect.

Overall, the literature suggests that interactive exhibits play a crucial role in enhancing visitor motivation and experience in science museums.

Methodology

This study adopts a quantitative research approach based on primary data collected through structured questionnaire method. Questionnaire was designed to capture visitor motivations, preferences, and perceptions of museum visit and on exhibits. Questionnaire designed to include both

closed-ended and Likert-scale questions. Questions were framed mainly on demographic details of visitors and to record their purpose or motive behind the visit, preferences and perception.

The survey was conducted at Visvesvaraya Industrial and Technological Museum, Bengaluru. The universe included the visitors to VITM. A total of 312 responses were collected from visitors using a convenience sampling method. Data cleaning was done through IBM SPSS statistics 31. The collected data were analyzed through Descriptive Statistics (percentage, Mean, Skewness, Kurtosis etc) and Comparative Analysis.

The essential secondary data for the study was collected through NCSM Annual Reports, Journals, Books, Websites related to the area of study and referred in detail.

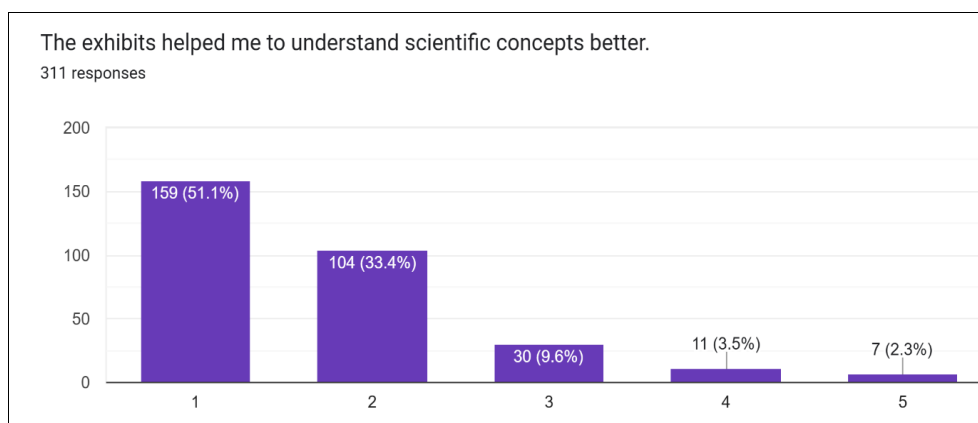
Analysis

The primary data collected from 312 respondents and the demographic details of the respondents is crucial in analyzing the pattern of visitors type and their preferences. The major demographic factors like Age, Gender, Education, Occupation, Residence location, Income level and Region of origin have been analyzed to reveal the inferences. The demographic profile of respondents indicates a diverse visitor base, including students, families, and tourists. A significant proportion of visitors were students, highlighting the educational importance of the museum.

Table 1: Demographic Profile and Educational Engagement Tendencies

Variable	Dominant Category	Interpretation
Age group	18–24 years (36.9%)	Indicates young adult dominance seeking educational enrichment
Gender	Male (69%)	Reflects higher male visitation rates during data collection (Visvesvaraya Museum)
Education	Undergraduate (37.6%) and Postgraduate (35.3%)	Suggests intellectual curiosity and formal learning motivation
Occupation	Students (41.8%)	Confirms museum use as an extension of academic exposure
Residence location	Urban (52%)	Highlights preference for structured, technology-driven learning spaces
Income level	Above ₹50,000/month (28.8%)	Represents middle-class cultural consumption of science
Region of origin	South India (77.1%)	Indicates proximity-driven participation and regional accessibility

Source: Primary data (VITM Survey, 2025)



Source: Primary data (VITM Survey, 2025)

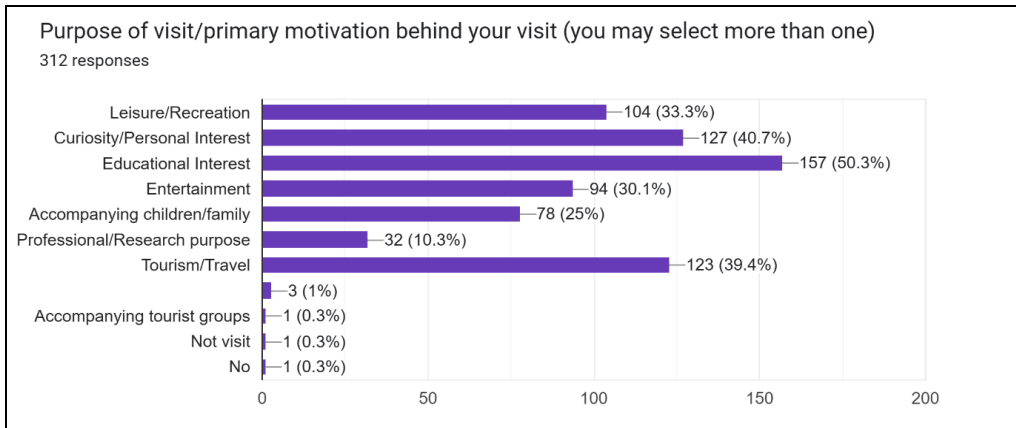
Fig 2: “The exhibits helped me to understand scientific concepts better.”

The data shows that a majority of visitors expressed strong agreement with the statement in a Likert scale. Specifically, 159 respondents (51.1%) selected Strongly Agree to the statement, and 104 respondents (33.4%) selected Agree, indicating a highly positive perception of the exhibits in enhancing understanding. Together, these categories account for over 84% of the total responses, demonstrating that most visitors found the exhibits effective for learning

scientific concepts. This reveals the education impact of exhibits on visitors. Visitors are learning or remembering some scientific concepts after the visit to the museum. A smaller proportion with 30 respondents (9.6%) selecting Neutral. This suggests that while the exhibits were generally effective, a limited number of visitors may not have experienced a strong impact on their understanding.

Very few respondents expressed disagreement, with 11 respondents (3.5%) selecting option 4 disagree and only 7 respondents (2.3%) selecting option 5 strongly Disagree. This indicates that negative perceptions of the exhibits are

minimal. This proportion of respondents may include the respondents with less or no education level and are from rural residence category.



Source: Primary data (VITM Survey, 2025)

Fig 3: Purpose of Visit/Primary Motivation behind your Visit

The chart illustrates the primary motivations behind visitors’ trips, based on 312 responses, where respondents could select multiple options.

The findings indicate that educational interest is the dominant motive, with 157 respondents (50.3%) selecting it. This highlights that the museum primarily functions as a learning space, attracting visitors who seek knowledge and intellectual enrichment.

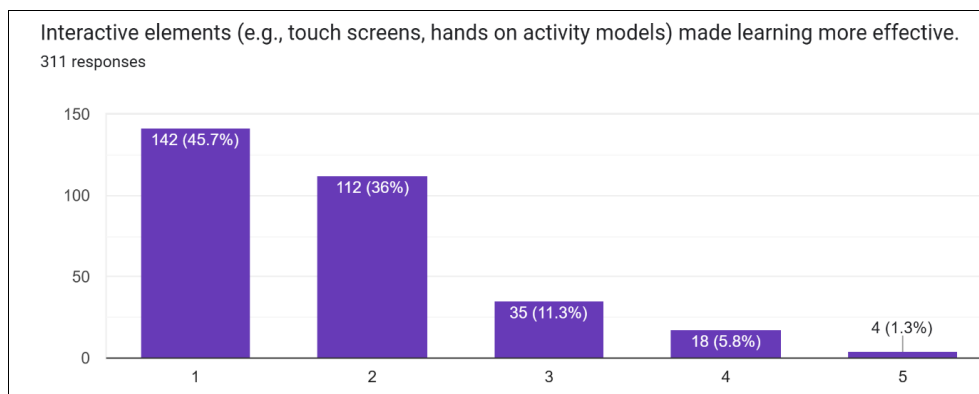
The second most significant motivation is curiosity/personal interest, chosen by 127 respondents (40.7%), suggesting that many visitors are intrinsically motivated to explore scientific concepts and exhibits out of personal enthusiasm. Tourism/travel (39.4%) and leisure/recreation (33.3%) also emerge as strong motivating factors, indicating that the museum is not only an educational hub but also a

recreational and tourist attraction. In fact, Tourism and Leisure put together appeared as the biggest motive with 72.7% in total. Similarly, entertainment (30.1%) reflects the role of interactive exhibits in making the visit enjoyable.

A notable proportion of visitors (25%) reported visiting while accompanying children or family, emphasizing the museum’s appeal as a family-oriented destination.

In contrast, professional/research purposes (10.3%) account for a relatively smaller segment, suggesting that the museum is less frequently used for formal academic or research activities.

Other categories such as accompanying tourist groups or miscellaneous responses represent a negligible proportion, indicating minimal influence on overall visitation patterns.



Source: Primary data (VITM Survey, 2025)

Fig 4: Interactive Elements made Learning More Effective

The results clearly indicate a strong positive perception of interactive elements in enhancing learning effectiveness. A majority of respondents expressed agreement, with 142 respondents (45.7%) selecting option 1 and 112 respondents (36%) selecting option 2. Together, these account for over 81% of the total responses, demonstrating that most visitors found interactive features highly beneficial for learning.

A smaller group of respondents, 35 individuals (11.3%), selected option 3, indicating a neutral stance. This suggests that while interactive elements are generally

effective, a few visitors may not have experienced a significant impact.

Very few respondents expressed disagreement, with 18 respondents (5.8%) selecting option 4 and only 4 respondents (1.2%) selecting option 5. This shows that negative perceptions toward interactive learning tools are minimal.

Overall Insight

The findings strongly support the idea that interactive elements significantly enhance learning effectiveness in

science museums. These features play a crucial role in making complex scientific concepts easier to understand, thereby improving visitor engagement and educational outcomes.

Descriptive Statistics Table

Based on the given Likert-scale responses (1–5) with frequencies:

Table 5.4.1

Scale	Description	Frequency	Percentage	Cumulative %
1	Strongly Agree	142	45.7%	45.7%
2	Agree	112	36%	81.7%
3	Neutral	35	11.3%	93%
4	Disagree	18	5.8%	98.8%
5	Strongly Disagree	04	1.2%	100%
Total (N)		311	100%	

Source: Primary data (VITM Survey, 2025)

Statistics	Value
Mean	1.81
Median	2
Standard Deviation	0.94
Skewness	+1.18
Kurtosis	3.98

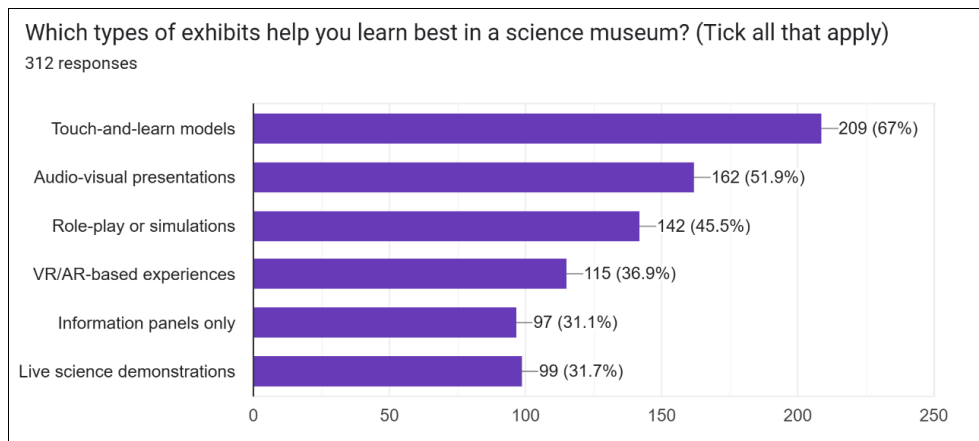
Interpretation of Statistics

Mean (1.81): The average response is close to 2, indicating overall agreement that interactive elements enhance learning.

Median (2): Confirms that the central tendency lies in the “agree” category.

Skewness (+1.18): The distribution is positively skewed (right-skewed), meaning responses are concentrated on the lower scale values (strong agreement), with a long tail toward higher values.

Kurtosis (3.98): Indicates a leptokurtic distribution (more peaked than normal), suggesting responses are highly concentrated around the mean with fewer extreme variations.



Source: Primary data (VITM Survey, 2025)

Fig 5: Type of Exhibits help the visitors learn best in the museum (multiple responses were allowed)

The results clearly indicate that touch-and-learn models are the most preferred learning method, with 209 respondents (67%) selecting this option. This highlights the strong effectiveness of hands-on, interactive experiences in enhancing understanding and engagement.

The second most preferred method is audio-visual presentations, chosen by 162 respondents (51.9%), suggesting that multimedia tools such as videos and digital displays play a significant role in supporting learning.

Role-play or simulations (45.5%) also rank highly, indicating that immersive and experiential learning methods are effective in helping visitors grasp scientific concepts.

VR/AR-based experiences (36.9%) show moderate preference, reflecting growing interest in advanced technologies, though they are not as widely impactful as traditional hands-on exhibits.

In contrast, live science demonstrations (31.7%) and information panels only (31.1%) received comparatively

lower responses. This suggests that while these methods contribute to learning, they are less engaging compared to interactive and participatory approaches.

Statistics	Value
Mode	1
Skewness	+0.62
Kurtosis	2.5 (approx.)

Statistical interpretation reveals that,

Mode (1): The most preferred exhibit type is touch-and-learn models, confirming it as the dominant learning method.

Skewness (+0.62): The distribution is positively skewed, meaning responses are concentrated toward lower values (more preferred interactive exhibits).

Kurtosis (2.5): Indicates a platykurtic distribution, suggesting a relatively flatter spread of preferences across different exhibit types.

Findings

The key findings of the study are:

1. Education and curiosity are the dominant motives for visitation followed with Tourism and Leisure.

The results demonstrate that education and curiosity are the primary driving forces, supported by tourism, leisure, and entertainment. Education emerged as the primary motive for most visitors. Curiosity was the second most important factor, particularly among younger visitors. Tourism had a comparatively significant influence among outstation visitors. Leisure was identified as a moderate motive, with families visiting for recreation.

2. Interactive exhibits significantly influence visitor motivation

The findings clearly suggest that the exhibits play a significant role in enhancing conceptual understanding, supporting the idea that interactive and engaging displays are effective educational tools in science museums.

3. Interactive exhibits contribute to higher visitor satisfaction

The statistical results reinforce that highly interactive exhibits (especially hands-on models) dominate visitor preferences, while other exhibit types are more evenly distributed, reflecting diverse learning preferences but a clear tilt toward interactivity.

4. Visitors prefer hands-on experiences over passive displays

The findings strongly emphasize that active, hands-on, and interactive exhibits are the most effective learning tools in science museums. Visitors prefer engaging experiences that allow them to participate directly, rather than passive methods such as reading information panels. This reinforces the importance of designing exhibits that prioritize interactivity and experiential learning.

Limitations of the Study

1. The study is limited to a single museum.

NCSM has 26 Science centres across the country, due to location advantage and mass visiting VITM has been selected to conduct the study. The results of this study may not be generalized to all the science museums in India. Comparative analysis can be conducted in future to test the visitor's motivation in other science museums.

2. Convenience sampling may affect generalizability.

Convenience sampling was found more appropriate method for data collection from the visitors for this study. But it has a limitation of affecting on generalizability of not including some category of visitors or the visitors unwilling to fill the questionnaire.

3. The sample size, though adequate, may not represent all visitor segments.

The sample size 312 is more than adequate to bring-out the inferences. But still it may not include the different segment of visitors as the VITM has diverse visitors' footfalls.

Future Research

Every research has an enormous scope for future research. This study can be further conducted by including multiple science museums for more inclusion of demographic and

geographic variables. Qualitative methods can be used for analyzing some set of data for deeper insights of visitors. The future research can focus on technological advancement in making exhibits more interactive like use of AI and Virtual - Augmented Realities.

Conclusion

The study concludes that At VITM - Bengaluru, visitor motivations are primarily driven by education and curiosity, supported by tourism and Leisure. The other motives are being Entertainment and Accompanying Children and Family. Interactive exhibits play a vital role in enhancing the attractiveness of science museums. Visitors are more likely to learn scientific concepts by hands on experiments/activities. Learning by doing is the most preferred method by the visitors visited VITM. The findings emphasize the need for museums to invest in interactive and engaging exhibits to attract and retain visitors. Such initiatives not only improve visitor experience but also contribute to educational and tourism development. Science museums are not only buildings to house some scientific artifacts but developed as centres for disseminating scientific and technical education with entertainment.

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