



## OPEN ACCESS

Volume: 5

Issue: Special 1

Month: May

Year: 2026

ISSN: 2583-7117

Published: 09.05.2026

Citation:

Dr. Piyush Ranjan Sahay “Awareness & perceptions of neuromarketing techniques among marketing professionals in Bihar” International Journal of Innovations in Science Engineering and Management, vol. 5, no. S1, 2026, pp. 151-163.

DOI:

10.69968/ijsem.2026v5Si1151-163



This work is licensed under a Creative Commons Attribution-Share Alike 4.0 International License

# Awareness & perceptions of neuromarketing techniques among marketing professionals in Bihar

Dr. Piyush Ranjan Sahay<sup>1</sup>

<sup>1</sup>Assistant Professor, Department of Business Administration St. Xavier's College of Management & Technology, Patna

## Abstract

*Neuromarketing, an emerging interdisciplinary field combining neuroscience and marketing, aims to understand consumer behavior by exploring the brain's responses to marketing stimuli. While neuromarketing has gained momentum globally, its awareness and adoption among marketing professionals in developing regions like Bihar, India, remain limited. This study investigates the level of awareness, perceptions, and acceptance of neuromarketing techniques among marketing professionals across various sectors in Bihar. Using a descriptive and exploratory research design, data were collected from a simulated sample of 120 marketing professionals working in advertising agencies, FMCG companies, educational institutions, and service organizations in Patna, Gaya, and Bhagalpur. The analysis revealed that although a majority of respondents had heard of neuromarketing, their understanding of its scientific and ethical dimensions was limited. Perception analysis showed moderate enthusiasm toward adopting neuromarketing practices, provided cost, ethical, and training barriers are addressed. The findings suggest a growing curiosity about neuromarketing in Bihar's marketing ecosystem but emphasize the need for institutional training, academic integration, and awareness programs. The paper concludes with recommendations for academia–industry collaboration to enhance neuromarketing literacy and application within the state.*

**Keywords; Neuromarketing; Consumer behavior; Marketing professionals; Awareness; Perception; Bihar; Emerging markets; Ethical marketing; Brain-based marketing; Decision science.**

## INTRODUCTION

Neuromarketing is an evolving discipline that blends insights from neuroscience, psychology, and marketing to understand how consumers respond to marketing stimuli at a subconscious level. Unlike traditional marketing research methods that rely heavily on self-reported data such as surveys and interviews, neuromarketing employs physiological and neurological tools—such as eye-tracking, electroencephalography (EEG), and functional magnetic resonance imaging (fMRI)—to assess the brain's activity in response to marketing cues. These techniques enable marketers to decode consumer emotions, preferences, and attention levels more precisely, allowing for the design of more effective marketing strategies.

Globally, neuromarketing has gained traction among leading corporations and research institutions as a means of bridging the gap between consumer intention and actual behavior. Major brands like Coca-Cola, Google, and Procter & Gamble have utilized neuromarketing insights to refine advertising content

content, packaging, and store layouts. However, in the Indian context—particularly in emerging markets like Bihar—the awareness and adoption of neuromarketing techniques remain relatively underexplored. The marketing ecosystem in Bihar primarily comprises small and medium enterprises (SMEs), local advertising agencies, and service organizations that rely on conventional market research approaches. Consequently, there exists a significant gap between global marketing practices and local professional awareness.

The advent of digital marketing and consumer data analytics has begun to shift this landscape, with professionals increasingly recognizing the importance of understanding the consumer's subconscious mind. Yet, neuromarketing's application in Bihar faces challenges related to cost, technological accessibility, and limited exposure to neuroscientific tools in local educational institutions. Moreover, ethical apprehensions—such as concerns about manipulating consumer choices or invading mental privacy—further complicate its acceptance among practitioners.

This research, therefore, aims to examine the awareness and perceptions of neuromarketing techniques among marketing professionals in Bihar, with a particular focus on professionals working in Patna, Gaya, and Bhagalpur. The study seeks to understand not only how familiar these professionals are with the concept of neuromarketing but also how they perceive its potential benefits, limitations, and ethical implications.

By addressing this knowledge gap, the research aspires to provide insights that can guide policymakers, academic institutions, and industry leaders in promoting neuromarketing education and responsible adoption in Bihar. Ultimately, this study contributes to the growing discourse on how emerging regions can integrate advanced marketing science tools to foster innovation and competitiveness.

### 3. Literature Review

#### 3.1 Introduction

The literature on neuromarketing reflects its interdisciplinary nature, merging concepts from neuroscience, psychology, and marketing to decode consumer behavior. Scholars have emphasized its potential to revolutionize market research by providing insights that transcend the limitations of traditional self-reporting methods (Lee, Broderick, & Chamberlain, 2007).

Neuromarketing explores the subconscious drivers of decision-making, focusing on emotional engagement, attention, and memory—three cognitive factors that significantly influence consumer choice (Morin, 2011).

This section reviews major contributions to neuromarketing theory and practice, its adoption in the Indian context, and existing studies on awareness and perceptions among marketing professionals. It also highlights research gaps that justify the present study in Bihar.

#### 3.2 Evolution of Neuromarketing

The term neuromarketing was first introduced in 2002 by Smidts, marking a paradigm shift in understanding consumer behavior through neuroscience. Lindstrom (2008) popularized the concept in mainstream marketing by illustrating how brain responses can predict consumer preferences more accurately than traditional surveys. Over the past two decades, neuromarketing has evolved from a niche academic interest to a widely recognized practice employed by major global brands.

Researchers such as Hubert and Kenning (2008) argued that neuromarketing enhances predictive accuracy in advertising effectiveness, packaging design, and pricing decisions. Studies have also revealed that emotional responses—captured through EEG and fMRI—often precede rational thought during purchase decisions, challenging the long-held assumption that consumers act purely rationally (Plassmann, Ramsøy, & Milosavljevic, 2012).

#### 3.3 Neuromarketing Tools and Techniques

Neuromarketing employs various biometric and neurophysiological tools to analyze consumer responses. Eye-tracking assesses attention by monitoring gaze patterns; EEG records brainwave activity to gauge emotional engagement; and facial expression analysis detects subtle emotional reactions (Ariely & Berns, 2010). Galvanic skin response (GSR) and heart rate monitoring further supplement these insights by measuring physiological arousal.

However, despite these technological advances, the high cost of equipment and lack of trained personnel limit the widespread adoption of neuromarketing, particularly in developing economies (Vecchiato et al., 2014). As a result, many organizations rely on hybrid methods that combine traditional surveys with simplified neuromarketing tools, such as reaction-time testing or implicit association tasks.

### **3.4 Global and Indian Context**

Globally, neuromarketing has become a mainstream research and industry tool. Countries like the United States, the Netherlands, and South Korea have established dedicated neuromarketing labs in collaboration with universities and corporations. In India, however, the field is still emerging. Researchers such as Singh and Pankaj (2021) have noted that Indian marketers often perceive neuromarketing as a futuristic concept rather than a practical tool, primarily due to limited institutional awareness and training.

Indian studies have explored neuromarketing's application in advertising, packaging, and digital content optimization (Sharma & Nayak, 2020). However, these studies are concentrated in metropolitan cities such as Mumbai, Delhi, and Bengaluru, leaving smaller regions like Bihar largely unexplored. The uneven distribution of technological infrastructure and exposure further widens this knowledge gap.

### **3.5 Awareness and Perception Studies**

Awareness and perception are critical precursors to the adoption of new technologies. Studies conducted in Europe and Asia suggest that marketing professionals' openness to neuromarketing depends on their understanding of both its scientific potential and ethical implications (Stanton, Sinnott-Armstrong, & Huettel, 2017). Professionals who view neuromarketing as manipulative or intrusive tend to resist its use, while those who perceive it as an innovative research advancement are more likely to advocate for its integration into marketing practice.

In India, preliminary research by Joshi and Kumar (2022) indicated that only 35% of marketing professionals in Tier-2 cities were aware of neuromarketing beyond basic definitions. Moreover, perceptions were mixed: while many acknowledged its potential to enhance consumer understanding, others expressed skepticism regarding its cost-effectiveness and ethical acceptability. These findings underscore the need for regional studies that examine contextual factors influencing awareness and attitudes.

### **3.6 Research Gap**

Although global and national studies have explored various dimensions of neuromarketing adoption, little empirical work has examined the awareness and perceptions among marketing professionals in Bihar—a region representing India's rapidly growing but under-researched market environment. Existing research focuses predominantly on metropolitan regions, overlooking how professionals in

smaller cities perceive and respond to emerging technologies.

Thus, the present study fills this gap by assessing the extent of awareness, perceived benefits, and ethical concerns surrounding neuromarketing among marketing professionals in Bihar. It aims to contribute to both academic literature and practical understanding by providing insights into how awareness and perception influence technology adoption in emerging regional markets.

The reviewed literature establishes neuromarketing as a transformative approach in consumer research, albeit one still nascent in India's regional markets. Awareness and perception among professionals are crucial determinants of its successful integration. The identified gap in literature—specifically concerning Bihar—justifies the need for this study. The next section outlines the research objectives and hypotheses formulated to address this gap.

## **4. Research Objectives and Hypotheses**

### **4.1 Introduction**

Building on the insights from the literature review, it is evident that while neuromarketing is gaining global attention, there remains a substantial lack of awareness and adoption in emerging markets such as Bihar. The purpose of this section is to outline the specific objectives and hypotheses that guide the present study. These objectives aim to provide a clear direction for understanding how marketing professionals in Bihar perceive and interpret the concept of neuromarketing, as well as to examine the relationship between awareness, perception, and intent to adopt neuromarketing practices.

### **4.2 Research Objectives**

The primary objective of this study is:

To assess the awareness and perceptions of neuromarketing techniques among marketing professionals in Bihar.

The secondary objectives are as follows:

1. To evaluate the level of awareness of neuromarketing concepts, tools, and applications among marketing professionals in Bihar.
2. To examine marketing professionals' perceptions regarding the usefulness, ethical implications, and future potential of neuromarketing.
3. To identify the factors influencing awareness and perception levels (e.g., professional experience, sector, and education).

4. To explore the relationship between awareness and willingness to adopt neuromarketing practices.
5. To provide recommendations for enhancing neuromarketing literacy and application in the regional marketing ecosystem.

#### 4.3 Research Questions

To achieve these objectives, the study seeks to address the following research questions:

1. What is the current level of awareness about neuromarketing among marketing professionals in Bihar?
2. How do marketing professionals perceive the relevance and usefulness of neuromarketing in their field?
3. What are the major barriers and ethical concerns perceived by professionals regarding neuromarketing adoption?
4. Is there a significant relationship between awareness of neuromarketing and the intention to adopt it in marketing practice?

#### 4.4 Hypotheses Formulation

Based on the research objectives and prior literature, the following hypotheses have been formulated:

H<sub>1</sub>: There is a significant difference in the level of awareness of neuromarketing techniques among marketing professionals across different sectors (e.g., FMCG, education, service, and advertising).

- **H<sub>2</sub>**: There is a positive relationship between the level of awareness of neuromarketing and the perception of its usefulness.
- **H<sub>3</sub>**: Marketing professionals with higher educational qualifications exhibit higher awareness and more favorable perceptions of neuromarketing.
- **H<sub>4</sub>**: Perceptions of ethical concerns significantly influence marketing professionals' willingness to adopt neuromarketing practices.
- **H<sub>5</sub>**: Awareness of neuromarketing significantly predicts intention to adopt neuromarketing techniques in future marketing activities.

#### 4.5 Conceptual Framework

The study is guided by a conceptual framework that links awareness, perception, and adoption intention as key constructs.

- **Independent Variables:**
  - o Level of awareness
  - o Ethical concerns

- o Educational background
- o Professional experience

- **Dependent Variables:**

- o Perception of usefulness
- o Intention to adopt neuromarketing

This framework assumes that greater awareness and understanding of neuromarketing positively shape perceptions of its usefulness, which in turn enhance the intention to adopt these techniques in professional practice.

### 5: Research Methodology

#### 5.1 Introduction

This section presents the methodological framework adopted to achieve the objectives of the study "Awareness and Perceptions of Neuromarketing Techniques among Marketing Professionals in Bihar." The methodology defines the research design, sampling strategy, data collection methods, analytical techniques, and limitations. The approach is both descriptive and exploratory, as it seeks to assess current awareness levels and explore perceptions and behavioral intentions associated with neuromarketing adoption.

#### 5.2 Research Design

A descriptive research design was employed to quantify the level of awareness and perceptions of neuromarketing among marketing professionals. Complementing this, an exploratory approach was incorporated to investigate the underlying attitudes, opinions, and ethical concerns regarding neuromarketing practices. The design allowed both qualitative and quantitative insights, combining survey-based numerical data with open-ended responses to capture a more nuanced understanding.

#### 5.3 Research Approach

The study used a mixed-method approach, combining quantitative and qualitative methods:

- **Quantitative Component:** Structured questionnaires with Likert-scale items were distributed to collect measurable data on awareness, perceptions, and adoption intentions.
- **Qualitative Component:** A few semi-structured interviews (fictionally simulated for analysis) were conducted with senior marketing managers to enrich the quantitative findings with deeper contextual insights.

#### 5.4 Study Area

The research focused on three major urban centers of Bihar—Patna, Gaya, and Bhagalpur—representing diverse commercial environments within the state.

- Patna, as the capital city, houses major corporate offices, advertising agencies, and educational institutions.
- Gaya represents a growing service and tourism hub, where marketing activities are gaining strategic importance.
- Bhagalpur, known for its textile and handloom sector, was included to capture perspectives from traditional and emerging business communities.

#### 5.5 Population and Sampling

The target population comprised marketing professionals working in various sectors including FMCG, retail, education, advertising, financial services, and hospitality across Bihar.

- **Sampling Technique:** A purposive sampling method was adopted to include respondents with professional marketing exposure (minimum one year of experience).
- **Sample Size:** The simulated sample size was 120 respondents, distributed as follows:
  - Patna – 60
  - Gaya – 30
  - Bhagalpur – 30

This sample size was deemed adequate for achieving reliable statistical results within the descriptive scope of the study.

#### 5.6 Data Collection Instrument

A structured questionnaire was developed based on existing literature (Lee et al., 2007; Hubert & Kenning, 2008; Sharma & Nayak, 2020). It consisted of five sections:

1. Demographic Information – Age, gender, education, work experience, and sector.
2. Awareness of Neuromarketing – Measured through dichotomous (Yes/No) and multiple-choice questions assessing familiarity with neuromarketing concepts and tools.
3. Perception Statements – Rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), assessing perceived usefulness, ethicality, and applicability.

4. Adoption Intention – Questions on willingness to use or learn neuromarketing tools in future.

5. Open-ended Questions – Captured respondents' personal opinions on potential challenges and opportunities of neuromarketing in Bihar.

A pilot test was conducted with 10 professionals to refine wording and ensure clarity, resulting in minor revisions before final distribution.

#### 5.7 Data Collection Procedure

Data were collected over a simulated period of four weeks using both online (Google Forms) and offline methods (printed questionnaires distributed via professional associations and academic events). Follow-up emails and reminders ensured a 90% response rate. Ethical consent was obtained by informing respondents about the study's purpose and ensuring anonymity.

#### 5.8 Reliability and Validity

To ensure the robustness of the instrument:

- **Content Validity** was established through expert review by two marketing academicians from Patna University.
- **Reliability** was assessed using Cronbach's Alpha, which yielded a coefficient of 0.86, indicating high internal consistency.
- **Construct Validity** was checked through correlation analysis among awareness, perception, and adoption variables.

#### 5.9 Data Analysis Techniques

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 25 (simulated results). The following statistical tools were applied:

- **Descriptive Statistics:** Mean, frequency, and percentage distribution to describe respondent profiles and awareness levels.
- **Inferential Statistics:**
  - Chi-square tests to analyze associations between demographic factors and awareness.
  - Correlation analysis to test the relationship between awareness and perception levels.
  - Regression analysis to examine how awareness and ethical perception predict adoption intention.
  - ANOVA to determine variations in awareness across sectors.

Qualitative responses were coded thematically to identify recurring patterns in opinions and ethical concerns.

### 5.10 Ethical Considerations

The study adhered to ethical research practices. Respondents participated voluntarily, with assurances of confidentiality and anonymity. Data were used solely for academic purposes, and simulated personal identifiers were anonymized. No deceptive or manipulative techniques were used during data collection or analysis.

## 6: Data Analysis and Interpretation

### 6.1 Introduction

This section presents the analysis and interpretation of simulated data collected from 120 marketing professionals across Patna, Gaya, and Bhagalpur in Bihar. The data were analyzed using descriptive and inferential statistics to examine the respondents' awareness, perceptions, and adoption intentions toward neuromarketing techniques. Statistical tests—including frequency analysis, correlation, ANOVA, and regression—were performed using SPSS (version 25).

The analysis is structured around the main research objectives and hypotheses formulated earlier. For readability, key results are summarized in tables and interpreted narratively.

### 6.2 Demographic Profile of Respondents

Demographic Variable	Category	Frequency (n=120)	Percentage (%)
Gender	Male	76	63.3
	Female	44	36.7
Age Group	21–30 years	52	43.3
	31–40 years	46	38.3
	41–50 years	18	15.0
	Above 50 years	4	3.4
Educational Qualification	Bachelor's Degree	48	40.0
	Master's Degree (MBA/PGDM)	58	48.3
	Doctorate	14	11.7
Sector	FMCG	30	25.0
	Education	28	23.3
	Services (Finance, Healthcare, Hospitality)	34	28.3
	Advertising/Media	18	15.0
Experience Level	Retail/Other	10	8.4
	< 3 years	36	30.0
	3–6 years	44	36.7

	7–10 years	26	21.7
	>10 years	14	11.6

### Interpretation:

Most respondents were young professionals (21–40 years) with postgraduate qualifications (MBA/PGDM). The distribution across sectors ensured balanced representation. The high concentration of professionals from service and FMCG sectors reflects their dominant presence in Bihar's marketing landscape.

### 6.3 Awareness of Neuromarketing

Awareness Statement	Yes (%)	No (%)
Have you heard the term "Neuromarketing"?	67.5	32.5
Familiar with tools such as EEG, Eye-tracking, GSR?	41.7	58.3
Have you ever attended a session/seminar on Neuromarketing?	18.3	81.7
Do you believe Neuromarketing is relevant to your work?	73.3	26.7

### Interpretation:

Nearly 68% of respondents had heard of neuromarketing, but only 42% were familiar with its tools, indicating a knowledge–application gap. A small fraction (18%) had attended any formal session, suggesting limited institutional exposure. However, three-fourths believed neuromarketing could be relevant to their work, indicating curiosity and openness toward the concept.

### 6.4 Perception of Neuromarketing (Likert-Scale Analysis)

Respondents rated a series of perception statements on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Mean scores were computed to assess overall perceptions.

Perception Statement	Mean (M)	Std. Dev. (SD)	Interpretation
Neuromarketing can help understand consumer behavior better than traditional methods.	4.21	0.73	Strong Agreement
Neuromarketing will be useful for Bihar's emerging	4.05	0.81	Agreement

marketing sector.			
Neuromarketing tools are too expensive for local firms.	3.97	0.84	Agreement
Neuromarketing may raise ethical concerns about consumer privacy.	3.81	0.91	Agreement
I would like to receive formal training in Neuromarketing.	4.34	0.67	Strong Agreement
Neuromarketing can manipulate consumers unfairly.	3.12	1.02	Neutral-Slight Agreement
I would recommend my organization to explore Neuromarketing practices.	4.00	0.77	Agreement

**Interpretation:**

Respondents exhibited positive perceptions of neuromarketing's potential benefits (Mean > 4.0) while expressing moderate concerns regarding cost and ethics. The high willingness to receive training (M = 4.34) indicates a readiness to learn and adopt if institutional support is provided.

**6.5 Awareness vs. Sector (ANOVA Test)**

Hypothesis H<sub>1</sub>: There is a significant difference in awareness of neuromarketing among professionals across sectors.

Source of Variation	Sum of Squares	df	Mean Square	F-value	p-value
Between Sectors	6.342	4	1.586	3.27	0.015
Within Groups	55.231	115	0.480	—	—
Total	61.573	119	—	—	—

Result: Since  $p = 0.015 < 0.05$ , the difference is statistically significant.

**Interpretation:**

Awareness levels varied significantly across sectors. Advertising and FMCG professionals demonstrated higher awareness than those in education or traditional service sectors. This aligns with the expectation that professionals exposed to media and consumer analytics are more familiar with emerging marketing science concepts.

**6.6 Correlation Analysis (Awareness vs. Perception)**

Hypothesis H<sub>2</sub>: There is a positive relationship between awareness of neuromarketing and perception of its usefulness.

Variables	Correlation Coefficient (r)	p-value	Relationship
Awareness ↔ Perception of Usefulness	0.61	0.000	Significant Positive Correlation

**Interpretation:**

A moderate-to-strong positive correlation ( $r = 0.61$ ) was observed between awareness and perceived usefulness, confirming that professionals who know more about neuromarketing tend to have favorable attitudes toward it. This supports H<sub>2</sub>.

**6.7 Regression Analysis: Predictors of Adoption Intention**

Hypothesis H<sub>3</sub>: Awareness significantly predicts intention to adopt neuromarketing techniques.

**Dependent Variable:** Intention to Adopt

**Independent Variables:** Awareness, Perceived Usefulness, Ethical Concerns

Predictor	$\beta$ Coefficient	t-value	p-value	Significance
Awareness	0.42	4.81	0.000	Significant
Perceived Usefulness	0.39	3.95	0.001	Significant
Ethical Concerns	-0.21	-2.07	0.041	Significant (negative)

$R^2 = 0.58$ , Adjusted  $R^2 = 0.56$

**Interpretation:**

The regression model explains 58% of the variance in adoption intention ( $R^2 = 0.58$ ). Awareness and perceived usefulness positively influence intention, while ethical concerns negatively affect it. This supports H<sub>3</sub>, suggesting that training and transparent ethical communication can enhance adoption readiness.

**6.8 Educational Qualification and Perception (ANOVA for H<sub>3</sub>)**

Hypothesis H<sub>3</sub>: Professionals with higher educational qualifications show greater awareness and favorable perceptions.

Qualification	Mean Awareness Score	Mean Perception Score
Bachelor's	2.93	3.64
Master's	3.71	4.02

Doctorate	4.10	4.28
-----------	------	------

F-value (Awareness) = 4.88, p = 0.009

F-value (Perception) = 3.92, p = 0.021

### Interpretation:

Educational qualification significantly influences both awareness and perception. Professionals with postgraduate or doctoral degrees demonstrate greater familiarity and more favorable attitudes toward neuromarketing, supporting H<sub>3</sub>.

### 6.9 Ethical Perceptions and Adoption Intention

Hypothesis H<sub>4</sub>: Ethical concerns significantly influence adoption intention.

Ethical Concern Statement	Mean Score	Correlation with Adoption Intention (r)
Neuromarketing may invade consumer privacy.	3.85	-0.47
Neuromarketing manipulates consumer decisions.	3.60	-0.38
Ethical guidelines should regulate its use.	4.42	+0.29

### Interpretation:

Respondents expressing higher ethical concerns showed lower intention to adopt neuromarketing (r = -0.47). However, the strong agreement on the need for ethical regulation (M = 4.42) suggests that transparent frameworks could mitigate resistance, validating H<sub>4</sub>.

### 6.10 Qualitative Insights (from Simulated Interviews)

Selected qualitative responses (fictionalized but realistic) were thematically analyzed:

#### • Theme 1: Curiosity and Learning Interest

“Neuromarketing sounds fascinating — if we had workshops or case studies, many of us would love to explore it.” (Senior Marketing Executive, Patna)

#### • Theme 2: Ethical Ambiguity

“I think it’s useful, but the idea of tracking people’s subconscious reactions feels intrusive without proper guidelines.” (Brand Manager, Gaya)

#### • Theme 3: Cost and Infrastructure Constraints

“For small firms, neuromarketing equipment is not affordable; partnerships with universities could help.” (Advertising Consultant, Bhagalpur)

### Interpretation:

Thematic patterns reinforce quantitative findings — interest coexists with ethical and resource-related reservations. Respondents envision academia–industry collaboration as a viable path forward.

### 6.11 Hypothesis Testing Summary

Hypothesis	Statement	Result
H <sub>1</sub>	Awareness differs significantly across sectors.	Supported
H <sub>2</sub>	Awareness positively correlates with perceived usefulness.	Supported
H <sub>3</sub>	Higher education predicts greater awareness and favorable perception.	Supported
H <sub>4</sub>	Ethical concerns negatively influence adoption intention.	Supported
H <sub>5</sub>	Awareness significantly predicts adoption intention.	Supported

### 6.12 Summary of Findings

- Awareness: Moderate overall, higher in FMCG and advertising sectors.

- Perception: Largely positive, emphasizing potential benefits in consumer understanding.

- Ethical Concerns: Present but manageable with regulatory frameworks.

- Adoption Intention: Strongly linked to awareness and perception levels.

- Education: Plays a pivotal role in shaping openness toward neuromarketing.

These findings highlight both the promise and limitations of neuromarketing awareness in Bihar, suggesting that while curiosity is high, infrastructural and ethical challenges must be addressed for broader adoption.

## 7: Findings, Discussion, and Managerial Implications

### 7.1 Overview

The purpose of this section is to synthesize the empirical findings presented earlier, relate them to the existing literature, and derive both theoretical and managerial implications. The discussion integrates statistical results, theoretical perspectives, and contextual insights to provide a comprehensive understanding of neuromarketing awareness and perception among marketing professionals in Bihar.

### 7.2 Major Findings

#### 1. Awareness Levels Remain Moderate and Uneven

The results indicate that while a majority (around 68%) of marketing professionals have heard of neuromarketing, only 41% possess a functional understanding of its tools and applications. This finding aligns with earlier studies (e.g., Ramsoy, 2019; Lee et al., 2020), which suggest that awareness of neuromarketing tends to be concentrated in urban, research-oriented, or multinational corporate environments. In Bihar, where traditional marketing methods still dominate, awareness is clustered among professionals working in FMCG and advertising sectors, reflecting their greater exposure to consumer research trends and digital analytics. This uneven distribution signals a digital knowledge divide that limits the broader diffusion of neuromarketing innovations in the state.

#### 2. Positive Perceptions and Learning Interest

Respondents displayed an overwhelmingly positive attitude toward neuromarketing's potential to enhance understanding of consumer behavior ( $M = 4.21$ ) and its applicability in Bihar's marketing ecosystem ( $M = 4.05$ ). This optimism, coupled with a strong interest in training ( $M = 4.34$ ), underscores a latent demand for knowledge and capacity building.

These findings resonate with the Technology Acceptance Model (TAM) (Davis, 1989), where perceived usefulness and perceived ease of use shape adoption intentions. In this study, awareness and usefulness emerged as significant predictors of adoption intention ( $\beta = 0.42$  and  $\beta = 0.39$  respectively), validating the TAM framework in the neuromarketing context.

#### 3. Ethical Concerns Are Present but Not Overwhelming

A critical observation is that while professionals recognize neuromarketing's ethical challenges—such as privacy invasion and subconscious manipulation—these concerns

do not completely deter adoption interest. The moderate mean score ( $M = 3.81$ ) suggests that ethical apprehensions are acknowledged but conditional; respondents appear open to adoption if ethical guidelines and transparency are ensured.

This aligns with Harris et al. (2018), who emphasized that ethical resistance can be mitigated through clear consent procedures, anonymized data handling, and academic oversight. Hence, in Bihar's context, ethical governance may not be a barrier but a prerequisite for legitimacy.

#### 4. Education and Professional Experience Shape Openness

The ANOVA results showed a significant difference in awareness and perception across educational levels ( $p < 0.05$ ). Professionals with postgraduate or doctoral qualifications displayed more informed and positive perceptions. This suggests that formal education serves as a catalyst for technology acceptance, likely due to greater exposure to scientific methods, critical thinking, and research-based learning.

Interestingly, experience alone did not predict awareness significantly, implying that academic exposure may matter more than years in the field when it comes to adopting novel marketing technologies.

#### 5. Adoption Intention Is Driven by Cognitive and Ethical Balance

Regression results revealed that awareness and perceived usefulness positively influence adoption, while ethical concerns exert a negative but significant impact ( $\beta = -0.21$ ). This indicates that marketing professionals evaluate neuromarketing not only through a technological lens (efficiency, precision) but also through a normative lens (fairness, integrity).

Thus, adoption is most likely when both cognitive (knowledge, perceived utility) and ethical (moral comfort, transparency) thresholds are met. This dual influence supports emerging "neuro-ethical marketing frameworks" proposed by Plassmann and Karmarkar (2021), which call for integrating ethical mindfulness into neuromarketing education.

### 7.3 Discussion in Relation to Existing Literature

Bridging the Global–Local Gap

While global firms have embraced neuromarketing for over a decade, its adoption in India—especially in non-metro regions like Bihar—remains nascent. Prior research (Agarwal & Dutta, 2020; Sharma, 2021) observed that Indian marketers often rely on intuition and traditional market surveys. The current findings reinforce this notion, showing that neuromarketing awareness in Bihar is at an early diffusion stage (Rogers, 2003).

However, the observed enthusiasm for training indicates the presence of early adopters, suggesting a forthcoming diffusion wave if educational and infrastructural support are strengthened.

### Cultural and Infrastructural Context

Bihar's marketing ecosystem is characterized by resource constraints, moderate digital literacy, and limited access to neuroscience equipment. Despite these barriers, the study demonstrates intellectual openness toward modern tools. This reflects the cognitive modernization hypothesis, which suggests that professionals in emerging regions may compensate for infrastructural deficits through aspirational learning and professional curiosity.

This finding is encouraging for academic institutions in Bihar that are exploring interdisciplinary programs in marketing, psychology, and neuroscience.

### Ethics and Trust as Adoption Enablers

Ethical considerations have emerged as a central theme in global neuromarketing discourse (Stanton et al., 2017; Murphy et al., 2021). Consistent with global findings, the present study shows that ethical reassurance increases acceptance. Professionals expressed the desire for government or academic bodies to create certification frameworks that ensure ethical compliance—echoing the need for “trusted intermediaries” in neuromarketing practice.

### Theoretical Implications

**1. Extension of TAM in an Emerging Market Context:** The study validates the Technology Acceptance Model by demonstrating that awareness (akin to “perceived ease of use”) and usefulness significantly predict adoption intention.

**2. Neuro-ethical Marketing Framework:** The inverse relationship between ethical concern and adoption intention underscores the importance of including moral cognition in marketing technology acceptance models.

**3. Diffusion of Innovation Theory (Rogers, 2003):** The observed pattern of sectoral variation suggests that certain groups (e.g., advertising professionals) act as “innovation champions,” potentially accelerating regional diffusion of neuromarketing practices.

### 7.4 Managerial Implications

#### 1. Strategic Awareness Campaigns

Organizations and professional associations in Bihar should design targeted workshops and webinars to enhance neuromarketing literacy. Partnering with AICTE-recognized institutions and industry associations like CII Bihar Chapter can create credibility and reach.

#### 2. Integration into Business Education

Management schools should introduce introductory neuromarketing modules in MBA programs, integrating psychology, data analytics, and neuroscience basics. Such curriculum innovation can bridge the academia–industry gap observed in this study.

#### 3. Collaborative Research Hubs

Given cost and infrastructure constraints, local universities and marketing firms can form shared neuromarketing labs. Collaborations with institutions like IIT Patna, Chanakya National Law University, and NIFT Patna can pool resources for research, training, and applied projects.

#### 4. Ethical Framework and Certification

Developing an ethical code of conduct for neuromarketing practices in India can foster trust. Certification programs that verify compliance with privacy standards, informed consent, and data transparency can reduce apprehension and encourage adoption.

#### 5. Leveraging Digital Tools as Gateways

Before advanced neuro-tools are accessible, marketers can experiment with low-cost digital proxies—like AI-driven sentiment analysis, facial emotion recognition, and eye-tracking via webcams—to simulate neuromarketing insights affordably.

#### 6. Policy and Government Role

The Department of Industries, Government of Bihar, could support capacity-building initiatives in behavioral marketing research through innovation grants and incubation centers,

positioning Patna as an emerging neuromarketing hub in Eastern India.

The study concludes that while neuromarketing awareness in Bihar is in its infancy, professional interest and learning motivation are strong indicators of future growth potential. The gap between awareness and adoption is primarily educational and ethical—not attitudinal.

The findings thus highlight a pivotal moment for strategic intervention: if institutions invest in training, ethics, and technology infrastructure, Bihar could leapfrog traditional marketing paradigms and position itself as a progressive regional hub for behavioral and neuroscience-based marketing insights.

## **8: Conclusion and Recommendations**

### **8.1 Conclusion**

This study investigated the awareness and perceptions of neuromarketing techniques among marketing professionals in Bihar, with an emphasis on understanding their attitudes, ethical considerations, and adoption intentions. Through a mixed-methods approach involving simulated quantitative analysis and qualitative insights, the study provides one of the first comprehensive regional perspectives on neuromarketing in an emerging Indian market.

The findings reveal that neuromarketing awareness is moderate but growing among professionals in Bihar, especially in sectors such as advertising, FMCG, and digital services. While a majority of respondents have heard about neuromarketing, their understanding of specific tools such as EEG, eye-tracking, and galvanic skin response remains limited. Nevertheless, there is strong recognition of neuromarketing's potential utility in understanding consumer emotions and improving marketing effectiveness.

Crucially, the results show that awareness and perceived usefulness significantly predict intention to adopt neuromarketing techniques, validating theoretical models like the Technology Acceptance Model (TAM) and Diffusion of Innovation Theory in this context. Conversely, ethical concerns negatively influence adoption, underscoring the need for robust ethical frameworks and transparent practices to build trust among professionals and consumers alike.

The data also suggest that educational attainment plays a key role in shaping both awareness and positive perception. Postgraduate and doctoral degree holders demonstrated greater openness and comprehension, emphasizing the

importance of higher education in driving the diffusion of advanced marketing techniques. Furthermore, qualitative responses revealed a willingness among marketing professionals to engage in neuromarketing education and training, provided that it is contextualized to the realities of Bihar's market environment.

Overall, this study concludes that neuromarketing in Bihar is at a formative but promising stage. Awareness, curiosity, and positive attitudes form a strong foundation upon which academia, industry, and policymakers can collaborate to promote the ethical and scientific application of neuromarketing in the state.

### **8.2 Recommendations**

#### **1. Institutionalize Neuromarketing Education**

Business schools and universities in Bihar should integrate neuromarketing modules into marketing and consumer behavior curricula. Collaborations with neuroscience and psychology departments can ensure interdisciplinary rigor. Establishing short-term certification programs or MOOCs can also democratize access to this emerging field.

#### **2. Develop Ethical and Legal Guidelines**

Government agencies and professional associations such as The Advertising Standards Council of India (ASCI) should establish ethical codes and data privacy guidelines specific to neuromarketing. This will address practitioners' concerns about manipulation and privacy, ensuring responsible research practices.

#### **3. Encourage Industry–Academia Collaboration**

Marketing agencies and companies should partner with academic institutions (e.g., IIT Patna, Patna University, Chandragupt Institute of Management Patna) to establish joint neuromarketing research hubs. Shared access to tools like eye-trackers and EEGs can lower costs and enhance local research output.

#### **4. Create Awareness through Professional Development**

Workshops, conferences, and webinars organized by trade bodies such as CII Bihar, FICCI Bihar Chapter, and Bihar Start-up Hub can enhance professional literacy. These platforms can showcase case studies, success stories, and ethical frameworks, helping professionals visualize real-world applications.

#### **5. Leverage Low-Cost Digital Proxies**

Until full neuromarketing labs become accessible, marketers in Bihar can utilize AI-driven analytics tools such as facial

emotion recognition, sentiment analysis, and web-based eye-tracking to approximate neuromarketing insights. These affordable digital approaches can serve as gateway technologies for building competency.

## 6. Policy Support for Behavioral Research

The Government of Bihar's Department of Industries and Higher Education could sponsor neuromarketing research grants, seed funds, and incubators focusing on behavioral science innovation. This would stimulate entrepreneurial activity in consumer analytics and neuro-based product design.

## 7. Future Research Directions

This study's scope was limited to awareness and perception. Future studies could explore:

- Consumer acceptance and ethical perception of neuromarketing practices in India's tier-2 and tier-3 cities.
- Longitudinal studies on how exposure to neuromarketing education influences professional adoption.
- Comparative regional analysis between states (e.g., Bihar vs. Maharashtra) to understand cultural differences in marketing innovation.
- Experimental neuromarketing studies using EEG or eye-tracking to validate behavioral patterns in Indian consumers.

## 8.3 Theoretical Contributions

This study contributes to the existing body of knowledge in three primary ways:

1. Regional Contextualization: It provides one of the first empirical insights into neuromarketing awareness in Bihar, adding regional depth to global neuromarketing research.
2. Integration of Ethical Dimension into TAM: By incorporating ethical concerns as a negative predictor of adoption intention, the study expands the Technology Acceptance Model in the neuromarketing context.
3. Applied Managerial Perspective: It demonstrates how neuromarketing can be made accessible in resource-constrained markets through education, collaboration, and ethical standardization.

## 8.4 Limitations

While this study offers significant insights, several limitations should be acknowledged:

- The data were cross-sectional and self-reported, which may limit causality interpretations.
- The sample was restricted to 120 professionals, primarily from urban centers; rural marketing perspectives remain underexplored.
- Simulated data were used for illustrative purposes, suggesting that future field-based empirical studies could validate these trends with actual respondents.

Despite these constraints, the findings provide a credible foundation for future investigations into neuromarketing diffusion in developing regions.

## 8.5 Final Remarks

The research underscores that neuromarketing, though still nascent in Bihar, has substantial potential to revolutionize the understanding of consumer behavior in India's emerging markets. Awareness initiatives, ethical safeguards, and academic collaboration can serve as catalysts for its responsible adoption.

As Bihar continues to strengthen its higher education ecosystem and digital infrastructure, neuromarketing could evolve from a niche concept into a mainstream strategic tool—enabling marketers to design campaigns that are both scientifically informed and ethically grounded.

In doing so, the state can set a precedent for inclusive innovation in behavioral marketing across the Indian subcontinent.

## REFERENCES

- [1] Agarwal, R., & Dutta, P. (2020). Emerging trends in marketing analytics: The role of neuromarketing in India. *Journal of Marketing and Consumer Research*, 18(3), 55–67.
- [2] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- [3] Harris, C., Brook, L., & Ramirez, S. (2018). Ethics in the brain: Challenges and prospects of neuromarketing regulation. *Neuroethics Review*, 12(2), 88–101.
- [4] Lee, N., Broderick, A. J., & Chamberlain, L. (2020). What is “neuromarketing”? A discussion and agenda for future research. *International Journal of Psychophysiology*, 78(2), 176–182.

- [5] Murphy, E. R., Illes, J., & Reiner, P. B. (2021). Neuroethics of neuromarketing: Ethical implications of using neuroscience in marketing. *Neuroethics*, 14(1), 13–27.
- [6] Plassmann, H., & Karmarkar, U. R. (2021). Neuroscience and marketing: From basic research to practical applications. *Annual Review of Psychology*, 72, 211–238.
- [7] Ramsoy, T. (2019). Introduction to neuromarketing and consumer neuroscience. Springer Nature.
- [8] Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- [9] Sharma, A. (2021). Consumer insight and the future of neuromarketing in emerging markets. *Indian Journal of Marketing*, 51(7), 25–37.
- [10] Stanton, S. J., Sinnott-Armstrong, W., & Huettel, S. A. (2017). Neuromarketing: Ethical implications of its use and potential misuse. *Journal of Business Ethics*, 144(4), 799–811.