

The Moderating Role of Market Domain in Neuromarketing Adoption: A UTAUT-Based Investigation Among Marketing Professionals in an Emerging Economy

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Abstract

This paper investigates the moderating role of market domain in the relations of Unified Theory of Acceptance and Use of Technology (UTAUT) constructs and behavior intentions of neuromarketing technologies among the marketing professionals in Pakistan. Although it may sound alluring to businesses worldwide, with or without conscious deliberation, Neuromarketing is still being adopted at random, especially in the developing world. This study aims to assess the relationship that exists between performance expectancy, effort expectancy, social influence and facilitating conditions and how these connections can result in adoption intentions; and more to the point how these connections differ among different market regions through the application of framework of the UTAUT. A total of 392 marketing professionals were sampled and data analyzed through Partial Least Squares Structural. Equation Modelling (PLS-SEM). Findings demonstrate important direct performance impacts. effort expectancy ($b = 0.243$, $p < 0.001$), effort expectancy ($b = 0.269$, $p < 0.001$) and facilitating. conditions ($b = 0.208$, $p < 0.001$) of behavioral intentions. At the same time, the effect of direct significance of social influence was not found ($b = 0.021$, $p = 0.716$). Importantly, market domain was moderated significantly, where it acted as moderator (positive with performance expectancy, $b=0.147$, $p<0.001$, facilitating conditions, $b= -0.239$, $p<0.001$ and negative with social. My influencing power, $\beta=-0.239$, $p<0.001$) significant. The recently modeled model accounted for the variation of the adoption intention ($R^2 = 0.699$) by 69.9%. These findings broaden UTAUT theory by showing that technology use context within a professional environment essentially changes technology adoption situations and invalidates the general applicability of technology acceptance models. Practical implications are about the importance of neuromarketing vendors and organizations developing approaches appropriate for the realm they are operating in, as opposed to using a one-size-fits-all approach. The study adds to the literature on markets from the upstreaming perspective by offering empirical evidence from the collectivist context that characterizes Pakistani culture.

Keywords: Performance Expectancy, Effort Expectancy, Social Influence, Facilitation Conditions, Market Domain and Behavior Intentions.

INTRODUCTION

The current marketing environment is undergoing a fundamental change due to technological innovation and the changing consumer behaviour (Keller & Kotler, 2021). Among the most important developments that have changed the face of marketing practice is neuromarketing, an interdisciplinary field exploring consumer behaviour through neurological and physiological approaches that integrates neuroscience, psychology and marketing research methodologies (Plassmann et al., 2015). This convergence is not just an incremental thrust in the way that research is conducted, but can also result in a paradigm shift in the way that marketing professionals understand, predict and influence the decision making process of consumers.

Neuromarketing is the use of advanced neuroscience tools, including functional magnetic resonance imaging (fMRI), electroencephalography (EEG), eye-tracking, facial coding and galvanic skin response measurement, to examine consumers' subconscious responses to marketing stimuli (Lee et al., 2007). These methodologies provide information that is not obtainable using traditional marketing research methods, such as surveys, focus groups, and observational studies, particularly regarding implicit attitudes, emotional response, attention patterns, and unconscious decision-making processes (Kenning & Linzmayer, 2011). The global neuromarketing industry has experienced huge growth with market valuations estimated at \$2.8 billion in 2027, indicating a compound annual growth rate of more than 12% according to Grand View Research (2021).

Despite new investments and current research focus, neuromarketing application in marketing concerns is still nowhere near universal across the globe and especially in the developing market situations (emerging markets) of Pakistan (Crespo-Pereira et al., 2020). This patchy pattern of adoption raises basic questions about what factors support the types of marketing and prevent them from adopting the neuromarketing technologies. Understanding these dynamics of adoption is vital to multiple stakeholders such as technology vendors in the design and positioning of neuromarketing technologies, educators in the design of training programs and practitioners in decision-making in regard to professional development and investments in organisational resources.

Research Context and Problem

Pakistan, as an emerging economy with population over 230 million (the world's fifth-largest consumer market), provides an interesting context for the study of adaptation of neuromarketing technologies (World Bank, 2023). The Pakistani marketing profession has seen a profound change over the past two decades leaning toward more data-based, digital, and strategic marketing approaches (Amin et al., 2020). However, the marketing professionals in this context are in a special cultural, economic, and institutional environment that may influence technology adoption decisions to a significant degree.

A critical examination of the available literature shows some important knowledge gaps. First, while research on technology adoption has produced sophisticated theoretical frameworks (Venkatesh et al., 2003) to describe the acceptance of technology, including the Unified Theory of Acceptance and Use of Technology (UTAUT), these frameworks have not been beneficial for understanding neuromarketing adoption specifically. Second, most existing studies are limited to developed Western markets, and perspectives from emerging markets remain grossly underrepresented. Third, previous studies have generally focused on organisational-level adoption decisions rather than individuals' adoption intentions within the profession. Fourth, there has been too little attention paid to boundaries and moderating factors that make adoption determinants elsewhere across professional segments.

Research Objectives and Contribution

This study addresses these gaps by reviewing the factors that affect marketing professionals' intention to adopt neuromarketing technologies in Pakistan, using UTAUT as the theoretical framework, and critically investigating the moderating role of the market domain. Specifically, this study examines the moderating effects, if any, of market domain (the professional area in which marketing professionals operate) on the relationships among these UTAUT constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) and behavioural intentions to adopt neuromarketing.

The study makes several salient contributions. Theoretically extends UTAUT by showing that professional identity modifies technology adoption, thereby challenging the assumption that technology acceptance models are universally applicable. Methodologically, it uses Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine complex moderation relationships in the context of emerging markets. Practically, the findings offer actionable insights for technology vendors, marketing educators, associations, and organisational decision-makers to understand and help spur appropriate adoption of neuromarketing.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Neuromarketing: Evolution and Current State

Neuromarketing emerged from the integration of cognitive neuroscience and marketing research, fundamentally changing traditional assumptions about how to measure consumer behaviour (Ariely and Berns, 2010). The field is based on the notion that much consumer behaviour is motivated by neurological and emotional processes that are inaccessible to what are thoughtfully considered to be standard methods of self-reporting, in which consumers do not have introspective access to their valid preferences or give socially desirable instead of honest responses (Wilson and Dunn, 2004).

Contemporary neuromarketing methodologies employ a variety of methods for identifying techniques. Functional magnetic resonance imaging (fMRI) detects blood oxygen level-dependent (BOLD) signals, which are used to map brain activation during decision-making (Plassmann et al., 2015). Electroencephalography (EEG) is a technique for acquiring electrical activity over the brain's surface, enabling temporal resolution of cognitive processing at the MS scale (Fortunato et al., 2014). Eye-tracking technologies identify patterns of attention and visual processing hierarchies, and facial coding is applied to micro expressions to determine emotional responses (Lee et al., 2007). The global neuromarketing industry is projected to reach \$2.8 billion by 2027 (Grand View Research, 2021). Galvanic skin response measurements are used to detect physiological arousal via electrodermal activity (Kenning & Linzmajer, 2011).

Despite technological sophistication and increasing industry investment, centrally focused patterns of neuromarketing adoption remain uneven worldwide. Large multinational corporations and specialised research agencies in developed markets have made neuromarketing increasingly common. In contrast, small and medium enterprises and organisations in developing economies (as well as many individual marketers) remain hesitant to incorporate such complex and costly technologies (Lim, 2018). This disparity in adoption motivates the systematic study of the factors that influence professionals' technology acceptance decision-making.

Technology Adoption Theories

A number of theoretical developments have been proposed in the recent adoption and acceptance of technology. According to TAM formulated by Davis (1989), the perceived usefulness and the perceived ease of use are the determinants of the technology acceptance. According to Ajzen (1991), behaviour intentions are influenced by attitudes towards the behaviour, subjective norms, and the perceived control in the Theory of Planned Behaviour (TPB). The Innovation Diffusion Theory of Rogers (2003) found that the relative advantage, compatibility, complexity, trialability and observability are the characteristics of innovation that affect the adoption decisions.

When we realised the constraints and disintegration of these models, Venkatesh et al. (2003) came up with the Unified Theory of Acceptance and Use of Technology (UTAUT) integrating eight well-known models of technology acceptance. UTAUT recognises four significant constructs as direct predictors of behavioural intention and behaviour use, which include performance expectancy (exercise and the technology will provide benefits), effort expectancy (easy associated with technology use), social influence (degree to which essential others believe that one should technology use), and facilitating conditions (degree to which organisational and technical infrastructure is available to support to technology use). It is also postulated in the model that among these constructs, and behavioural intentions, the associations are moderated by gender, age, experience, and voluntariness.

UTAUT in Professional Technology Adoption

UTAUT has been validated and used in varied technological scenarios, such as information systems (Venkatesh & Bala, 2008), e-commerce platforms (San Martin & Herrero, 2012), mobile applications (Wang et al., 2009), healthcare technologies (Hoque & Sorwar, 2017), and educational tools (Tarhini et al., 2017). Meta-analyses provide solid empirical support for UTAUT predictive efficacy, with the model generally accounting for 40-70% of the variance in behavioural intentions across different contexts (Dwivedi et al., 2019).

However, UTAUT applications in marketing technology adoption, especially in neuromarketing, remain limited. Existing research on neuromarketing has primarily focused on documenting neuromarketing techniques, assessing validity for specific research questions, or addressing ethical issues (Murphy et al., 2008). However, few studies systematically examine adoption determinants from the perspective of established theoretical frameworks. The limited studies that have offered theoretical models of innovation (Crespo-Pereira et al., 2020; Lim, 2018) on neuromarketing adoption have either used atheoretical exploratory methods or put forward conceptual models for treatment without rigorous empirical testing.

Market Domain as Professional Context

Marketing professionals are not a monolithic population but exhibit considerable heterogeneity across several dimensions. Market domain refers to the specific professional area within marketing (e.g., digital marketing, brand management, market research, advertising, or general marketing). It is a critical dimension of professional context and is fundamental to technology evaluation and adoption processes.

Across market areas, unique characteristics may change the relationships between the UTAUT construct and adoption intentions. Digital marketing professionals operating in high-tech environments, with an emphasis on data analytics and precision measurement, may view performance benefits differently than brand management professionals seeking to build long-term brand equity. Market research professionals, whose primary skills involve generating consumer insights, may view the performance utility of neuromarketing differently than advertising professionals, who are primarily focused on the creative development of marketing messages. Similarly, expectation of effort towards neuromarketing implementation may be expected to vary systematically by domain; to regard extant technological capabilities, data analytics and methodology skills. Social influence dynamics may differ from field to field with some professional communities experiencing greater normative pressures or peer effects than others. Facilitating conditions such as organisational resources, technical support and implementation assistance may be more easily accessible or be more important in some domains than others.

Emerging Market Context Considerations

Emerging markets have different contextual factors for potential influences on technology adoption that might be different than the situation in developed Western markets where much of the UTAUT research has been conducted. Pakistan's collectivist cultural orientation, as indicated by a high score on Hofstede's (2011) collectivism dimension, suggests that social influence effects are amplified compared to individualistic cultures (Western cultures). However, this cultural expectation may interact in complex ways with professional context, which may vary across market domains with different levels of professional autonomy and patterns of peer interaction. Resource constraints prevalent among emerging-market organisations (Burgos-Campero & Vargas-Hernandez, 2013) may heighten the significance of performance expectations, facilitating conditions in which marketing professionals are careful about cost-benefit trade-offs and implementation feasibility. Educational and infrastructural differences shape expectations of effort, as marketing professionals weigh the need for learning and its complexity against available support and training resources (Higher Education Commission Pakistan, 2022). These contextual factors emphasise the importance of considering technology adoption in emerging markets, rather than assuming the direct transferability of findings.

Hypothesis Development

Based on UTAUT theory and in the context of neuromarketing adoption among marketing professionals within an emerging economy, we offer the following hypotheses for both direct effects and market domain moderation:

Direct Effects of UTAUT Constructs

H1: Performance expectancy will positively influence behavioral intentions to adopt neuromarketing technologies.

H2: Effort expectancy positively influences behavioral intentions to adopt neuromarketing technologies.

H3: Social influence has a positive effect on behavioral intentions to adopt neuromarketing technologies.

H4: Facilitating conditions have a positive effect on behavioral intentions to adopt neuromarketing technologies.

Moderating Effects of Market Domain

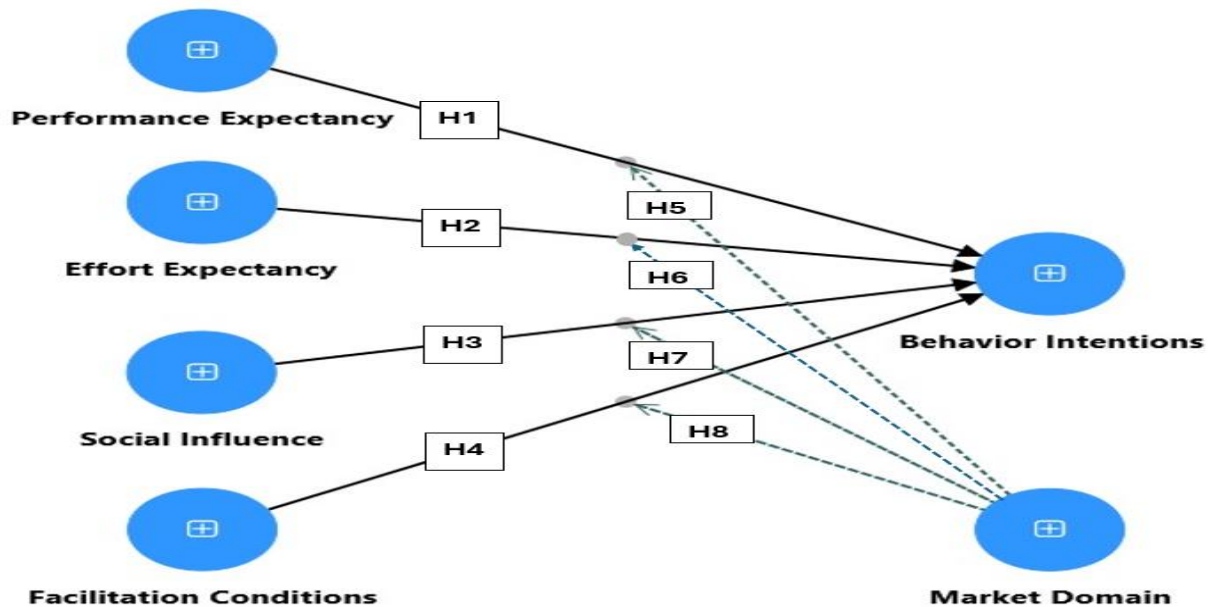
H5: The market domain moderates the relationship between performance expectancy and behavioural intentions, with the positive effect more substantial in some market domains.

H6: Market domain moderates the relationship between effort expectancy and behavioural intentions, with the positive effect varying across market domains.

H7: Market domain moderates the relationship between social influence and behavioural intentions, i.e. the positive effect of social influence varies across market domains.

H8: Market domain moderates the relationship between facilitating conditions and behavioural intentions in such a way that the positive effect differs between market domains.

Figure 1: Conceptual Research Model



Conceptual Research Model - UTAUT Framework with Market Domain Moderation (Adapted from Venkatesh et al., 2003)

RESEARCH METHODOLOGY

Research Design and Philosophical Approach

The research design adopted in this study is quantitative based on the positivist philosophical paradigm, which assumes the existence of an objective reality that can be measured and analysed by use of empirical observation (Creswell and Creswell, 2018). The research uses a cross-sectional survey to investigate relationships among the UTAUT constructs, the market domain, and behavioural intentions for adopting neuromarketing technologies. This approach is appropriate for testing theoretically derived hypotheses regarding relationships between variables in a natural environment (Hair et al., 2019).

The design of the research integrates the analyses of the possible direct and moderation effects through structural equation modelling (SEM). Direct effects explore whether UTAUT performance expectancy, effort expectancy, social influence, and facilitating conditions have substantial, segmented, statistical predictive validity on behavioural intentions. Moderation analysis examines the hypothesised effect of market domain on the magnitude or form of such relationships, examining interactions between each of the UTAUT constructs and market domain and their behavioural intentions.

Population and Sampling Strategy

The target population is marketing professionals working in Pakistan in different types of organisations: multinational corporations, local organisations, small and medium enterprises, and independent consultants. Marketing professionals are individuals whose primary job responsibilities include developing, executing, or conducting marketing strategy research.

A purposive sampling strategy was used to ensure sufficient representation across the following domains: digital marketing, brand management, market research, advertising, and general marketing. This approach enables meaningful comparisons across professional contexts while maintaining practical feasibility given the specialised nature of the target population (Etikan et al., 2016). To establish a suitable sample size, we adhered to the recommendations of Hair et al. (2017) for the PLS-SEM method, which recommends a minimum sample size of at least 10 times the number of the most significant directed structural paths to any construct in the model. With four direct paths and three interaction terms leading to behavioural intentions, a minimum sample of 70 respondents was required. However, to have good statistical power for detecting moderation effects and to perform subgroup analyses, a substantially larger sample was indicated.

Data Collection Instrument

A structured questionnaire was developed based on validated measurement scales from the UTAUT literature. Measurements of all constructs were carried out using multi-item scales modified for the neuromarketing adoption context. Performance expectancy was measured using four items assessing the perceived benefits and usefulness of neuromarketing for better marketing results. Effort expectancy consisted of 4 items that assessed perceived ease of learning and the adaptation of neuromarketing methodologies. Social influence included four items: normative pressures from peers and supervisors, and the professional network. Facilitating conditions included four items regarding organisational support, resources and availability of technical infrastructure. Behavioural intentions were assessed using six items that examined the likelihood and willingness to use neuromarketing technologies.

All measurement items used 5-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree), to align with Venkatesh et al.'s (2003) original UTAUT instrument design. The market domain was categorised, as respondents had to select their main professional field from five possible choices: digital marketing, brand management, market research, advertising, and general marketing. Additional demographic variables relating to age, professional experience, type of organisation, educational background, etc., were gathered for descriptive purposes.

Before full-scale data collection, the questionnaire was pilot-tested with 30 marketing professionals to obtain an appreciation of clearness, understanding and face validity. Minor changes to the wording were made from pilot feedback to ensure that items were contextually appropriate for the Pakistani marketing context.

Data collection took place over six months from April 2025 to October 2025 and through multiple distribution channels to ensure maximum coverage from different segments in the marketing professional population. An online survey platform was used that could ensure convenient participation and automated data collection. Distribution channels included professional marketing associations, several LinkedIn professional networks, email marketing to corporate marketing departments, and marketing-focused professional groups on social media platforms.

Participation was voluntary and respondents were assured of confidentiality and anonymity. The survey introduction contained explicit information about research goals, participant rights and data use. Ethical considerations were addressed by gaining informed consent in order to participate in a survey and by no longer allowing respondents to leave the study at any time. No personally identifiable information was collected other than generic demographics needed for research analysis.

To ensure the quality of data, a number of steps were taken. Attention check questions were included throughout the survey to help detect response carelessness. This was done using IP address tracking which blocked responses from the same source, several times. Incomplete responses were automatically excluded, and only fully completed questionnaires were retained for analysis. Response time monitoring indicated excessively rapid manual review completions for inattentive patterns of responding.

Sample Characteristics

A total of 392 valid responses were obtained after data cleaning and quality checks. There was indeed good representation within the market domains in our sample: digital marketing (28.3%), general marketing (24.5%), market research (18.6%), brand management (16.8%), and advertising (11.8%). The gender distribution showed that 62.5% of respondents were male and 37.5% were female, in line with the gender distribution of the marketing profession in Pakistan.

The age distribution showed 31.4% in the 25-30 years age group, 29.8% in the 31-35 years age group, 22.7% in the 36-40 years age group, and 16.1% in the over-40 years age group. Professional experience varied, with 33.2% having 1-3 years, 28.6% having 4-6 years, 21.9% having 7-10 years, and 16.3% having over 10 years. Educational qualifications showed that 68.4% held master's degrees and 31.6% held bachelor's degrees, indicating the educated background of the growing Pakistani marketing force.

Organizational affiliation revealed 42.3% working in multinational corporations, 31.6% in large local organizations, 17.9% in SMEs, and 8.2% as independent consultants. This distribution offers sufficient variation across organizational cohorts to be meaningful in analyses while still focusing on the employment classes most relevant to neuromarketing adoption decisions.

Data Analysis Approach

The data analysis method was Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4 (Ringle et al, 2022). PLS-SEM was the method of choice considering several methodological considerations. First, the use of PLS-SEM is particularly suitable for exploratory research with the extension of existing theory, since this research represents the extension of UTAUT by analyzing market-domain moderation in a new context (Hair et al., 2019). Second, PLS-SEM is generally capable of processing complex models that include multiple constructs and relationships, and the support of moderation analysis (which is complicated by interaction effects) (Henseler et al., 2016). Third, PLS-SEM imposes very few distributional assumptions, and is robust to departures from multivariate normality, which would be essential, considering the nature of survey data (Sarstedt et al., 2017).

A 2-stage web approach elucidated by Hair et al. (2017) formed the basis of the PLS- SEM analysis. Notations of reliability and validity of constructs in the measurement model were evaluated on the basis of indicator loading, internal consistency reliability (Cronbach alpha and composite reliability), convergent validity (average variance extracted) and divergent validity (Fornell-Larcker criterion and Heterotrait-Monotrait ratio). Path coefficients, coefficient of determination (R²), effect sizes (f²) and predictive relevance (Q²) were used to determine the model assessment of structural models.

Moderation analysis was conducted using the product indicator model, by creating product variables by multiplying the standardized indicators of the moderator variable (market) and the indicators of the predictors for each predictor variable (Henseler and Chin, 2010). The bootstrap resampling technique (5,000 repetitions) was used to analyze the significance of path coefficients, for a bias-corrected confidence intervals and p-values for hypothesis testing (Hair et al., 2017).

Measurement Model Assessment

The reliability and validity of the measurement scales were well analyzed in accordance with the criteria for the PLS-SEM evaluation. Reliability and validity statistics for the constructs are presented in Table 1.

Table 1: Construct Reliability and Validity

Construct	Cronbach's Alpha	rho_a	CR (rho_c)	AVE
Behavior Intentions	0.877	0.881	0.907	0.619
Effort Expectancy	0.763	0.774	0.849	0.586
Facilitation Conditions	0.787	0.793	0.862	0.609
Performance Expectancy	0.826	0.834	0.886	0.661
Social Influence	0.790	0.790	0.864	0.615

Internal consistency reliability was determined by both measures-Cronbach's alpha and composite reliability (rho_c), which both exceeded the recommended cut off of 0.70 (Hair et al., 2019). All constructs had Cronbach's alpha values that ranged from 0.763 to 0.877 and composite reliabilities that ranged from 0.849 to 0.907, all indicating excellent internal consistency. Average variance extracted (AVE) values varied from 0.586 to 0.661 and were all greater than 0.50. They showed that over half of the variance in the constructs is accounted for by their constructs.

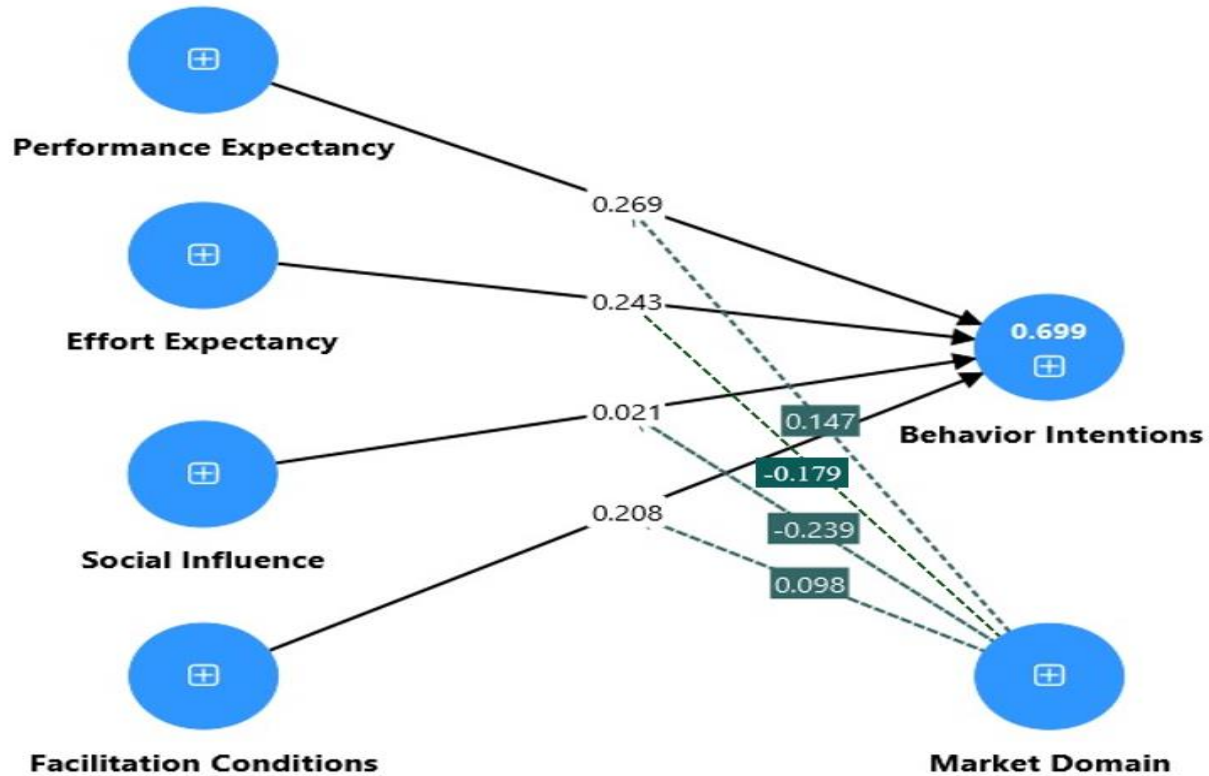
Discriminant validity was tested by Fornell-Larcker criterion and HTMT that is considered stringent. Fornell-Larcker criterion: Square root of AVE of each construct should be a number higher than correlation of this construct with another one. This criterion was met for all constructs, with the square roots of the AVEs (diagonal values in the correlation matrix) being greater than all the correlation between constructs. The HTMT ratio is used to assess discriminant validity by comparing the mean correlations between items across constructs measuring different concepts with the mean correlations within the same construct. Following conservative guidelines, it is expected that all HTMT values for conceptually distinct constructs are below 0.85 (Henseler et al., 2015). Most of the HTMT values met this criterion, with only a few slightly exceeding 0.85 and remaining below 1.00, indicating acceptable discriminant validity given the theoretical relationships among UTAUT constructs.

Multicollinearity was assessed using the variance inflation factor (VIF) values. All VIF values were below the conservative threshold of 3.0, with the highest at 2.596, indicating that

multicollinearity is not a concern in parameter estimation (Hair et al., 2019). This confirms that the predictor variables are sufficiently distinct and that there are no problematic levels of correlation to make strong regression coefficient estimates.

RESULTS

Figure 2: Structural Model Results with Path Coefficients



Structural Model Assessment

Following the confirmation of the adequacy of the measurement models, the structural model was assessed to examine hypothesized relationships. Path coefficients, statistical significance, coefficient determination, effect sizes, and predictive relevance were assessed using the structural model. Table 2 shows the path coefficients and their significance levels for all hypothesized relationships.

Table 2: Structural Model Path Coefficients

Path	Beta	Mean	SD	t-value	p-value
Performance Expectancy → BI	0.269	0.269	0.029	9.286	0.000
Effort Expectancy → BI	0.243	0.242	0.035	6.866	0.000
Social Influence → BI	0.021	0.023	0.058	0.363	0.716
Facilitating Conditions → BI	0.208	0.209	0.030	6.988	0.000

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Path	Beta	Mean	SD	t-value	p-value
Market Domain → BI	0.179	0.177	0.027	6.608	0.000
MD × PE → BI	0.147	0.148	0.022	6.674	0.000
MD × EE → BI	-0.179	-0.179	0.033	5.380	0.000
MD × SI → BI	-0.239	-0.237	0.037	6.472	0.000
MD × FC → BI	0.098	0.098	0.027	3.653	0.000

Note: BI = Behavioral Intentions; MD = Market Domain; PE = Performance Expectancy; EE = Effort Expectancy; SI = Social Influence; FC = Facilitating Conditions

Direct Effects of UTAUT Constructs

Hypothesis 1 proposed that performance expectancy positively influences behavioral intentions to adopt neuromarketing. This hypothesis was significantly supported ($\beta = 0.269$, $t = 9.286$, $p < 0.001$), indicating that marketing professionals perceive a significant performance boost when they believe in neuromarketing and that they tend to have significantly higher adoption intentions.

Hypothesis 2: Effort expectancy has a positive relationship with behavioral intentions. This was also supported (beta = 0.243, $t = 6.866$, $p < 0.001$), demonstrating that the relative ease of learning and implementation of neuromarketing by professionals is associated with higher adoption intentions. The effect size is nearly equivalent to that of performance expectancy, suggesting that perceived ease of use is almost as important as perceived benefits.

Hypothesis 3 suggested the social influence has a positive impact on behavioral intentions. Against expectations, this hypothesis was not supported ($b = 0.021$, $t = 0.363$, $p = 0.716$). This is a significant finding in the light of the collectivist orientation of the Pakistani culture, and may imply the professionals may be less vulnerable to normative pressures in the case of adoption of technology in the workplace compared to consumers.

Hypothesis 4 stated that behavioral intentions are positively influenced by facilitating conditions. This hypothesis was significantly supported ($b = 0.208$, $t = 6.988$, $p < 0.001$), which shows that professionals who perceive adequate organizational support and resources have substantially higher adoption intentions, indicating the importance of organizational enablers in the professional technology adoption.

Moderating Effects of Market Domain

The basic contribution of this study is to explore the effects of market domain on the relationships between UTAUT constructs and behavioral intentions. The results of the analysis are informative of significant, theoretically meaningful moderation effects in multiple relationships.

Hypothesis 5 stated that the market domain moderates the relationship between performance expectancy and behavioral intentions. This hypothesis was supported, with the interaction term having a significant positive effect ($t = 6.674$, $p < 0.001$) and a significant beta coefficient (beta = 0.147). Given this positive moderation, the results suggested that the strength of the positive effects of performance expectancy on adoption intentions increases in specific market domains. In areas where assessments of measurable outcomes, quantitative metrics, and return on investment are highly valued (for example, in market research or data analytics specialism), the perceived performance improvements driven by neuromarketing are shown to have a substantially greater influence on the intention to adopt it. In contrast, domains more focused on creative expression, subjective judgment or strategic intuition may have weaker associations between performance

expectations and adoption intentions since professionals in those domains may consider other factors more critical in their technology adoption choices.

Hypothesis 6 suggested that the market domain acts as a moderator of the relationship between effort expectancy and behavioral intentions. This hypothesis was strongly supported ($\beta = -0.179$, $t = 5.380$, $p < 0.001$), which was the most substantial moderation effect in the model. The negative coefficient suggests that the market domain has a significant negative influence on the positive relationship between effort expectancy and adoption intentions in some situations. This implies that perceptions of implementation complexity may vary across professionals, reflecting the degree of technical infrastructure and the analytical or methodological sophistication of each specialization. Domains requiring extensive technical expertise or complex analytical workflows may show weaker relationships between ease-of-use perceptions and adoption intentions, as professionals in these areas may prioritize functionality and capabilities over ease of implementation.

Hypothesis 7 stated that the market domain mediates the relationship between social influence and behavioral intentions. This hypothesis was supported, although in a direction that came as quite a surprise. The interaction term demonstrated a significant adverse effect ($\beta = -0.239$, $t = 6.472$, $p < 0.001$). This negative moderation means that in some areas of the market, the role of social influence on adoption intentions diminishes. In more analytical domains or in cultures with individual expertise or more autonomous decision-making, the normative pressure from others, such as peers and opinion leaders, seems to have less influence on adoption decisions. Conversely, in contexts where structures are more collaborative or collective norms are more prevalent, the role of social influence may be more prominent in shaping adoption intentions, while the overall trend is that domain context reduces rather than enhances the effects of social impact.

Hypothesis 8 stated that market domain would moderate the relationship between facilitating conditions and behavioral intentions. This hypothesis was supported as the interaction had a significant positive effect ($\beta = 0.098$, $t = 3.653$, $p < 0.001$). The availability and adequacy of facilitating conditions are more critical to adopting intentions in some market domains than others, suggesting that organizational support and resources have differential importance across professional contexts. Domains with a greater need for more extensive technical infrastructure or organizational buy-in may be found to be more sensitive to facilitating conditions.

Strong Moderation (H7, H6): These factors greatly under domains. Social influences and complexity of implementation are viewed very differently in analytical versus collaborative fields and demand very customized implementation approaches.

Moderation (Moderate) Weak (H8): This is a factor that is moderately varied across domains. Organizational support needs tend to be level and similar across all professional specializations, which suggests greater use of more universal approaches to implementation demonstrates success.

Moderate Moderation (H5): This range is in between strong and weak. Performance benefits are differently valued in different domains but also not to the very high level of social or complexity factors.

Summary of Hypothesis Testing Results

The results of the hypothesis testing can be summarized in Table 3.

Table 3: Summary of Hypothesis Testing Results

Hypothesis	Result	Beta (p-value)
H1: Performance Expectancy → Behavioral Intentions (+)	Supported	0.269 (0.000)

Hypothesis	Result	Beta (p-value)
H2: Effort Expectancy → Behavioral Intentions (+)	Supported	0.243 (0.000)
H3: Social Influence → Behavioral Intentions (+)	Not Supported	0.021 (0.716)
H4: Facilitating Conditions → Behavioral Intentions (+)	Supported	0.208 (0.000)
H5: Market Domain moderates PE → BI	Supported	0.147 (0.000)
H6: Market Domain moderates EE → BI	Supported	-0.179 (0.000)
H7: Market Domain moderates SI → BI	Supported	-0.239 (0.000)
H8: Market Domain moderates FC → BI	Supported	0.098 (0.000)

Model Explanatory Power

The full model, including direct effects and moderation terms, showed excellent explanatory power. The coefficient of determination (R²) is 0.699; the model explains approximately 69.9% of the variance in behavioral intentions toward neuromarketing technology among marketing professionals. This R² value is much larger than common thresholds used to indicate a good model of variation in behavioral research (Cohen, 1988). It is fair compared to results reported in meta-analytic studies on UTAUT, where variance is generally explained between 40% and 70% (Dwivedi et al., 2019).

The adjusted R² of 0.697 indicates that the high percentage of explained variance is not simply due to the model's complexity but rather reflects the model's predictive power. The slight difference between R² and adjusted R² (0.002) suggests that the inclusion of interaction terms provides a substantive explanation rather than overfits the data.

DISCUSSION

Interpretation of Direct Effects

The strong positive effects of performance expectancy and effort expectancy on behavioral intentions align with core UTAUT predictions and extensive prior research (Venkatesh et al., 2003). Marketing professionals are considering adopting neuromarketing methods through a rational cost-benefit analysis, balancing perceived performance benefits with the complexity of implementation. The almost equivalent effect sizes indicate that neither dimension is overwhelming, that both practical benefits and usability considerations are essential to a large degree.

The non-significant direct effect of social influence is a theoretically relevant result that contradicts the standard wisdom on technology adoption in collectivist cultures. While Pakistan's cultural orientation may well predict strong effects of social influence (Hofstede, 2011), there are apparent differences between professional and consumer technology adoption. Marketing professionals may have greater professional latitude in evaluating technology and will rely on evidence-based assessments rather than normative pressures. Alternatively, there may be no direct effects due to the selective influence of different social networks: some promote the adoption of a new practice, while others show skepticism about its validity or ethical implications.

The significant positive effect of facilitating conditions highlights the importance of the organizational enablers for professional technology adoption. Marketing people know that individual intentions, no matter how positive, will not be converted into actual adoption in the

absence of adequate organizational commitment and resources, technical infrastructure, and implementation support. This finding highlights the significance of realizing that technological adoption is not an individual decision, but rather it is made in the context of organizations that allow or constrain its implementation.

The Critical Role of Market Domain

The most important finding of this study was that primarily the market domain can modify the UTAUT relationship with adoption intentions. This finding raises some questions about the generalizability of technology acceptance models and calls into question the role of professionals' context in understanding the dynamics of acceptance.

The positive moderation of market domain in the relationship between performance expectancy suggests that performance expectancy (perceived value of neuromarketing) varies in a systematic manner across professional contexts. Marketing professionals in Research intelligent fields (market research, digital marketing), for example, may see a much more direct, immediate performance benefit arising from neuroscience-based consumer insights than those in more creative fields (advertising, brand management) where subjective judgment and artistic interpretation may be valued above the need for quantitative measurement. This domain-specific value perception underlies the significance of performance expectations for adoption decisions today, especially for the professionals whose work is most subsidized by the analyzing capabilities of neuro-marketing.

The negative moderation of market domain on social influence is the most theoretically interesting result of the study. While there is no overall effect of social impact, in some professional settings, the relationship with adoption intentions becomes significantly negative. This suggests that marketing professionals working in analytically oriented or methodologically rigorous domains actively resist peer pressure and normative influences and consider them incompatible with evidence-based decision-making. On the other hand, those with a line of work that emphasizes collaboration or creativity might be more receptive to social influences. This negative moderation means that what is observed as a null effect at the aggregate level conceals opposing processes at work across various professional contexts.

The positive moderation of the market domain on facilitating conditions indicates that organizational support is more critical for adoption in specific professional contexts. Domains that require a great deal of organizational commitment, budget commitment, or cross-functional organization to implement neuromarketing are more sensitive to facilitating conditions. This implies that the importance of organizational enablers does not exist; rather, it depends on the extent of organizational integration required for technology implementation in given professional situations.

Theoretical Implications

This study contributes in several important ways, particularly through its theoretical contributions to technology adoption research and UTAUT literature. First, it shows that the professional context, operationalized as the market domain, serves as an essential boundary condition that fundamentally alters how established determinants of adoption influence behavioral intentions. This is an extension of UTAUT, showing that moderators (gender, age, experience, voluntariness) included in the original model do not capture the full range of factors that are important in the work context. The professional domain is an additional moderator that may be particularly relevant to understanding the adoption of specialized professional technologies.

Second, the paper challenges assumptions about cultural determinism in technology adoption. Despite Pakistan's collectivist orientation, the operation of social influence differs in ways that

cultural frameworks would rather not see. This suggests that professional norms, domain-specific values, and evidence-based decision-making orientations can override more generalized cultural influences on professional technology adoption in health care settings. Further studies are needed to investigate how interactions between professional and national cultures affect technology acceptance.

Third, the findings highlight essential heterogeneity across contexts that null effects in aggregate models may mask. The non-significant direct impact of social influence masks systematic variation across market domains, where its effects are positive in some settings and negative in others. This underlines the importance of testing for moderation effects rather than accepting null findings at face value because apparently weak/non-existent/robust negative relationships may reflect opposing processes in different subgroups.

Practical Implications

For Technology Vendors and Service Providers

Neuromarketing technology vendors and service providers should not rely on one-size-fits-all marketing and positioning values, but rather on domain-specific ones. For market research and digital marketing professionals, the focus will be on proving tangible performance and ROI, and on measuring increases in accuracy. For brand management and advertising professionals, positioning should emphasise that neuromarketing is a complement, not a substitute for creative judgment, and is seen as another insight that informs, not dictates, innovative decisions.

Product development should focus on lowering expectations for effort in their product by implementing user-friendly interfaces, automated analysis, and integration with the existing marketing technology stack. Training programs and implementation support should be tailored to content and must recognise that professional contexts call for variations in skill development processes and approaches to integration within an organisation.

For Marketing Educators and Professional Development

Marketing education programs should include some neuromarketing content, contextualised to the professional domain. Instead of generic tests and courses on neuromarketing, curricula should evolve domain-specific modules with applications relevant to expected career paths upon graduating their students. Case studies, hands-on exercises, and guest speakers must represent diverse market domains to help students understand the various applications of neuromarketing in a professional setting.

Professional development programs should address this affective expectancy barrier by incorporating hands-on training, simulation activities, and graduated exposure to neuromarketing methodologies. Certification programs may consider developing tracks under a particular domain for specialised training, as may be appropriate in the professional context.

For Organizations and Marketing Departments

Organizations that consider adopting neuromarketing should realize that success depends on creating the right conditions. Budget allocation, technical infrastructure development, vendor relationship management, and the development of internal expertise all need to be addressed systematically. Organizations should conduct a preparedness review of these dimensions before implementing neuromarketing.

Importantly, organizations should understand that adoption dynamics differ across marketing areas within their departments. Implementation strategies should not be applied uniformly across all, but rather targeted to specific functional areas. Market research teams may need different support, training, and incentive structures than brand management or advertising teams.

For Individual Marketing Professionals

Marketing professionals assessing whether to build neuromarketing capabilities should ask questions such as whether there is a fit between their field of expertise and the technology's value proposition. Those who work in research-based, analytically focused fields are likely to find skills in neuromarketing to be of greater immediate value. Professionals working in creative or strategic fields should consider whether neuromarketing augments their current skill set and career paths or is a capability on the side.

Individual professionals should also be aware that the amount of organizational support has a significant impact on the success of adoption. Before becoming interested in neuromarketing training or proposing that the marketing organization adopt and use neuromarketing, marketing professionals should determine whether their organizations are in a position to equip themselves with the necessary resources, or whether other external partnerships, such as those with privacy-enhancing firms, might be more feasible.

Limitations and Future Research Directions

This study has several limitations that suggest directions for future research. The cross-sectional design captures intentions at a single point in time. Still, it cannot examine whether intentions translate into actual adoption behavior over time, underscoring the need for longitudinal research. While the market domain is discussed as a moderator in the study, the processes by which the domain is determined to have effects remain incompletely specified, and future research should examine mediating processes, such as domain-specific performance measures, professional norms, and organizational structures. The focus on Pakistan as a single emerging market context limits generalizability, and comparative research needs to be conducted across several emerging markets with different cultural and economic conditions. The operationalization of the market domain in this study is categorical. However, more sophisticated conceptualizations that examine aspects of the domain (analytical orientation, organizational structures, performance measurement approaches) as continuous moderators might be more precise. While convenience sampling via professional networks offers the advantage of adequate sample size and representation, it also carries the risk of selection bias, leading one to question whether probability sampling would yield greater generalizability. Finally, focusing solely on individual-level adoption intentions and not examining organizational-level decisions or implementation success suggests that multi-level research exploring the diffusion processes of neuromarketing from an individual's intention to the actual adoption of neuromarketing by organizational units would contribute to a more complete understanding of the diffusion processes of neuromarketing.

CONCLUSION

This study contributes to a better understanding of the adoption of neuromarketing by the marketing professionals by showing that professional context (operationalized as market domain) is a fundamental factor that moderates relationships between established determinants of the adoption process and behavioral intentions. While the UTAUT constructs of performance expectancy, effort expectancy, and facilitating conditions have a significant direct effect on

adoption intentions, such constructs differ in their influence on a considerable extent across different market domains.

The positive moderation of the market domain on performance expectancy and facilitating conditions suggests that perceptions of organizational benefits and support are more critical in specific professional contexts. Most interesting of all, negative moderation of social influence reveals how normative pressures may diminish adaptation intentions; in fact, in some areas, the norms of professional autonomy and evidence-based decision-making may override the pressures of social conformity.

These findings challenge certain assumptions about the broad applicability of technological acceptance models and underscore the critical importance of analyzing boundary conditions and moderating factors. The research extends UTAUT theory by adding the professional domain as a mediator, alongside the demographic characteristics and contextual variables of the original model. Practically, the study shows that successful neuromarketing adoption strategies need to be domain-specific rather than generic, tailored to the specific characteristics and decision-making processes of different segments of marketing professionals.

By reviewing neuromarketing adoption in the context of an emerging market (Pakistan), the study also contributes to understanding technology in less-explored contexts. The results of this study indicate that cultural factors play a role in technology use. Nonetheless, their impact can be more intricate than cultural determinism can anticipate, act otherwise in the workplace, and in such a case, be subdued by professional-substantial norms. Future research ought to concentrate on how professional domains mediate their modifying effects, determine whether adoption intentions translate to actual implementation over the timeframe, and determine whether alike trends of interference happen in other emerging marketplaces and of other professional technologies. Such studies will additionally assist in concentrating on the premises of the situations in professional practice that define the acceptance of technology and come up with more effective strategies of enabling proper adoption of technology among different professional groups.

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