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HOLISTIC NEUROMARKETING AS A CONCEPTUAL FRAMEWORK FOR STAKEHOLDER BEHAVIOUR AND COMMUNICATION IN ENVIRONMENTAL AND RESOURCE-BASED PROJECTS*

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Received 15 February 2026; accepted 6 May 2026; published 30 June 2026

Abstract. This study addresses the need to understand better stakeholder behaviour and communication processes in environmental and resource-based projects, where social acceptance and securing a social licence to operate are critical to project success. Traditional marketing approaches, although effective in coordinating organisational activities, often fail to capture the cognitive and emotional mechanisms that influence stakeholder decision-making under conditions of uncertainty and perceived risk. This paper aims to develop a conceptual framework of holistic neuromarketing that integrates holistic marketing principles with insights from neuroscience. The study is based on a conceptual research design that uses a systematic literature review, theoretical abstraction, and conceptual modelling. The proposed framework captures the relationships between communication inputs, cognitive-emotional processing, perceived risk, trust formation, and stakeholder behavioural responses. The findings indicate that integrating neuromarketing into holistic marketing enhances the analytical capacity of traditional frameworks by incorporating subconscious and affective dimensions of behaviour. The framework provides a structured basis for improving communication effectiveness, reducing stakeholder resistance, and supporting stakeholder acceptance, while also highlighting ethical considerations. The study contributes to interdisciplinary research and offers a foundation for future empirical investigation.

Keywords: holistic neuromarketing; stakeholder behaviour; stakeholder communication; environmental projects; risk perception

Reference to this paper should be made as follows: Drábik, P., Hanuláková, E., Daňo, F., Dúbravská, K., Mudarri, T. 2026. Holistic neuromarketing as a conceptual framework for stakeholder behaviour and communication in environmental and resource-based projects. *Entrepreneurship and Sustainability Issues*, 13(4), 419-429. <http://doi.org/10.9770/e2627663559>

JEL Classifications: M31

1. Introduction

Marketing theory and practice have undergone substantial transformation in recent decades, driven by technological advancements, socio-economic and geopolitical shifts, and increasing environmental pressures. In particular, the growing emphasis on sustainability, resource efficiency, and environmental responsibility has fundamentally altered the context in which marketing strategies are developed and implemented. Traditional marketing approaches, grounded in the 4P marketing mix (product, price, place, promotion), have historically

* This paper was published as an output of the project VEGA 1/0392/23: Changes in the approach to creating distribution management concepts for companies affected by the impacts of social and economic crises caused by the global pandemic and increased security risks, no. V- 23-230-00 of the University of Economics in Bratislava.

focused on transactional interactions between firms and customers. However, the increasing complexity of market systems and the need to address long-term stakeholder relationships necessitate a broader and more integrative perspective (Paramitha, 2024; Msosa et al., 2024; Ambrusevič & Išoraitė, 2025).

In response to these developments, the concept of holistic marketing has emerged as a comprehensive framework that integrates internal, integrated, relationship, and socially responsible marketing dimensions. This approach emphasises the creation of synergistic interactions among multiple stakeholders, including customers, employees, institutions, and communities. From a systems perspective, holistic marketing reflects the principles of holism, where the overall system performance cannot be reduced to the sum of its individual components (Smuts, 1926). Such an approach is particularly relevant in environmental and resource-based projects, where stakeholder perceptions, risk communication, and social acceptance significantly influence project feasibility and long-term sustainability (Iannaccone et al., 2024a). In particular, sectors such as mining, energy infrastructure, and waste management projects are characterised by high levels of environmental sensitivity and stakeholder scrutiny, where communication strategies play a critical role in shaping public perception and influencing project acceptance. Recent studies from the Slovak context further illustrate that stakeholder-oriented sustainability communication is increasingly relevant in projects linked to renewable energy, visitor infrastructure, and post-mining landscape reuse (Iannaccone et al., 2025).

The increasing complexity of stakeholder environments, especially in environmentally sensitive and resource-intensive sectors, has created a need for more advanced analytical and communication tools. In this context, neuromarketing has gained increasing attention as a multidisciplinary field that applies neuroscientific methods to investigate both conscious and subconscious responses to marketing stimuli. Neuroscience provides insights into neural mechanisms underlying decision-making, emotional processing, and perception, thereby offering a robust methodological basis for analysing stakeholder behaviour in complex environments (Camerer et al., 2018). Neuromarketing, originally conceptualised as the application of neuroscientific techniques to marketing problems, enables the identification of cognitive and emotional drivers that traditional research methods often fail to capture (Alsharif et al., 2021).

While traditional marketing has focused on the value and competitive advantage of a product or service, neuromarketing approaches the process holistically, considering the purchasing process itself and the retail environment to create a positive shopping experience. Research in neuroscience and knowledge of the human mind and its subconscious mechanisms in relation to purchasing behaviour and advertising have led to a paradigm shift towards a neuroscientific approach to marketing (Hakin & Levy, 2018; Husić-Mehmedović et al., 2026). Traditional marketing research methods, such as customer surveys, interviews, and questionnaires, have proven to be less reliable sources of research data (Alsharif et al., 2021).

Unlike traditional marketing approaches, which primarily rely on self-reported data, neuromarketing techniques—such as functional magnetic resonance imaging, electroencephalography, and eye-tracking—enable objective measurement of behavioural and emotional responses (Couwenberg et al., 2016; Vukethwele et al., 2025). This shift represents a significant methodological advancement, particularly in contexts where decision-making is influenced by uncertainty, perceived risks, and cognitive biases, as is typical in environmental and resource-based projects (Lim & Weissmann, 2023). In such contexts, stakeholder acceptance is not solely determined by rational evaluation but is strongly influenced by emotional and subconscious factors, which can significantly affect project implementation and the achievement of a social licence to operate (Jijelava & Vanclay, 2018).

Despite the growing body of research on both holistic marketing and neuromarketing, these concepts are predominantly examined independently within the existing literature. Their integration remains underexplored, particularly in environmental and resource-based systems, where complex interactions among stakeholders, institutions, and ecological constraints are critical. This gap highlights the need for a more integrated analytical framework that combines the systemic perspective of holistic marketing with the behavioural and cognitive insights provided by neuromarketing. Addressing this gap is essential to improving communication strategies, enhancing stakeholder engagement, and supporting more effective, sustainable decision-making in complex project environments.

2. Motivation and objective

The motivation for this study stems from the growing need to effectively manage stakeholder communication and perceptions in complex environmental and resource-based projects. High levels of uncertainty, perceived environmental risks, and conflicting stakeholder interests characterise these projects, and traditional communication and marketing approaches often prove insufficient (Jijelava & Vanclay, 2018). This is also evident in tourism- and landscape-related projects, where the successful development of visitor infrastructure or the adaptive reuse of post-mining areas depends on stakeholders' perceptions of environmental quality, accessibility, safety, and development benefits (Iannaccone et al., 2024b). In such contexts, decision-making processes are not solely driven by rational evaluation but are significantly influenced by cognitive biases, emotional responses, and subconscious perceptions of risk and trust (Wangzhou et al., 2021).

Conventional marketing models, although effective in stable market environments, do not fully capture the complexity of stakeholder behaviour in environments where social acceptance and legitimacy are critical for project implementation. While holistic marketing provides an integrative framework encompassing internal, integrated, relationship, and socially responsible dimensions, its application in environmentally sensitive contexts remains limited, particularly in addressing behavioural and cognitive aspects of stakeholder decision-making. At the same time, neuromarketing has emerged as a multidisciplinary approach that enables a deeper understanding of cognitive and emotional processes underlying human behaviour (Couwenberg et al., 2016). Despite its growing relevance, its integration with holistic marketing remains insufficiently explored, particularly in environmental and resource-based systems, where stakeholder perceptions and acceptance are key determinants of project success (Wiesner & Dargusch, 2022; Chipangamate et al., 2023). This gap highlights the need for a more comprehensive framework that combines systemic marketing approaches with insights from behavioural and neuroscientific research.

The aim of this paper is to explore the relationship between neuromarketing and holistic marketing, with a specific focus on their application in environmental and resource-based projects, particularly to improve stakeholder communication, perception management, and project acceptance. To achieve this aim, the following partial objectives were formulated:

1. To analyse the fundamental paradigms of holistic marketing (internal, integrated, relationship, and socially responsible marketing) in the context of environmental and resource-based project environments.
2. To examine the role of neuromarketing in understanding cognitive and emotional determinants of stakeholder behaviour, particularly in relation to risk perception and decision-making processes.
3. To investigate the integration of neuromarketing techniques into holistic marketing and assess their potential to enhance stakeholder communication, increase transparency, and support project acceptance.

The results of this study contribute to the development of an integrated conceptual framework that extends traditional marketing approaches by incorporating behavioural and cognitive dimensions. This framework provides a basis for more effective communication strategies and supports sustainable decision-making in complex project environments where stakeholder acceptance represents a critical success factor.

3. Methodological Framework and Analytical Approach

To achieve the defined research objectives, this study adopts a conceptual research design grounded in qualitative analysis, theoretical synthesis, and conceptual modelling. The research is based on the assumption that environmental and resource-based projects represent complex socio-technical systems characterised by multi-criteria decision-making, multi-stakeholder interactions, uncertainty, and dynamic processes of risk perception and stakeholder acceptance (Lim & Weissmann, 2023; Chipangamate et al., 2023).

Given the absence of a unified framework integrating neuromarketing and holistic marketing in environmental contexts, the primary aim of this study is not empirical testing, but rather the systematic conceptualisation and integration of existing theoretical knowledge into a coherent analytical framework. In this respect, the paper follows the logic of conceptual research, which seeks to develop new theoretical constructs and relationships by synthesising and extending established bodies of knowledge.

The analytical process is based on a systematic literature review and theoretical abstraction, drawing on scientific sources indexed in Web of Science, Scopus, and Google Scholar. The literature selection focused on contributions related to holistic marketing, neuromarketing, stakeholder behaviour, risk perception, and communication processes in complex systems. The review enabled the identification of key theoretical constructs and the extraction of relevant variables forming the foundation of the proposed framework (Alsharif et al., 2021; Wangzhou et al., 2021). Recent research also highlights the growing importance of integrating advanced analytical approaches with behavioural and neuroscience-based perspectives in marketing research. In this context, time series modelling and data-driven analytical methods are increasingly used to capture dynamic patterns in consumer and stakeholder behaviour, thereby extending the methodological foundations of neuromarketing and decision-making analysis. These approaches contribute to a deeper understanding of behavioural responses over time and support the development of more robust analytical frameworks in complex systems (Košíková et al., 2025).

Subsequently, comparative analysis and conceptual synthesis were applied to identify relationships among these constructs and to evaluate convergences and divergences across existing theoretical approaches. This process resulted in the development of a structured conceptual model that captures the interactions among communication inputs, cognitive-emotional processing, perceived risk, trust formation, behavioural responses, and stakeholder acceptance. The model reflects a deductively derived structure based on established theoretical assumptions in marketing, behavioural sciences, and environmental project management (Nilashi et al., 2020; Wichmann et al., 2022).

The relationships between variables are further formally structured at a conceptual level to enhance analytical clarity and internal consistency. This formalisation does not constitute an empirical estimate but provides a theoretical basis for future quantitative validation. The proposed framework is therefore designed as a theoretical model that can be subsequently operationalised and tested using quantitative methods such as regression analysis or structural equation modelling.

The use of the R programming language in this study is limited to a supporting role in structuring and visualising conceptual relationships within the model. It is not employed for statistical hypothesis testing or empirical data analysis. Its application serves to ensure logical coherence, transparency, and replicability of the conceptual structure rather than to generate empirical findings.

Overall, the methodological approach of this study is fully consistent with the characteristics of conceptual research, aiming to extend existing theoretical frameworks and provide a structured basis for future empirical investigation. The proposed model of holistic neuromarketing thus represents a theoretical contribution to the understanding of stakeholder behaviour and communication processes in environmental and resource-based systems, where social acceptance and legitimacy are critical determinants of project success.

4. Results

Holistic marketing as a systemic framework in environmental and resource-based projects

The analysis of holistic marketing confirms that this approach is a comprehensive, systems-oriented framework that integrates internal organisational processes, stakeholder relationships, communication strategies, and socially responsible practices. In the context of environmental and resource-based projects, this multidimensional structure is particularly relevant, as project success depends not only on technical feasibility but also on stakeholder perception, trust, and social acceptance.

The four core dimensions of holistic marketing—internal marketing, integrated marketing, relationship marketing, and socially responsible marketing—form an interconnected system that enables organisations to manage complex stakeholder environments. Internal marketing ensures alignment between organisational objectives and employee behaviour, which is essential for projects requiring interdisciplinary coordination and high operational reliability (Cangan, 2019). Integrated marketing provides consistency of communication across multiple channels, which is critical in environments characterised by uncertainty and heightened public sensitivity to environmental risks (Oiku & Adeyeye, 2023). Relationship marketing extends the focus beyond

transactional interactions and emphasises long-term engagement with stakeholders, including communities, institutions, and regulatory bodies (Kuncoro et al., 2022). Socially responsible marketing introduces an ethical and environmental dimension, ensuring that project implementation aligns with societal expectations, sustainability principles, and environmental protection requirements. In mining and resource extraction projects, where environmental impacts and community concerns are particularly pronounced, the application of holistic marketing principles provides a structured approach to managing stakeholder communication and mitigating potential conflicts.

Table 1. The holistic marketing concept

Components	Focus Area
Internal marketing	Senior management Marketing Department Other departments
Integrated marketing	Communication Products and services Promotion channels
Relationship marketing	Partners Customers Distribution networks
Socially Responsible marketing	Legal Community The environment Ethics

Source: own elaboration

From a systems perspective, these dimensions cannot be analysed independently, as their effectiveness emerges from their mutual interaction. In environmental and resource-based systems, where stakeholder trust and legitimacy are key determinants of project feasibility, holistic marketing provides a structural basis for managing communication, reducing conflicts, and supporting the achievement of a social licence to operate (Jijelava & Vanclay, 2018).

Neuromarketing as a tool for analysing stakeholder behaviour under uncertainty

The analysis further demonstrates that neuromarketing represents a significant methodological extension of traditional marketing approaches, particularly in contexts where stakeholder decision-making is influenced by cognitive biases, emotional responses, and subconscious processes. Unlike conventional research methods based on self-reported data, neuromarketing techniques enable the observation and measurement of underlying cognitive and affective mechanisms that shape stakeholder behaviour (Alsharif et al., 2021).

In environmental and resource-based projects, stakeholder responses to project-related information are often driven by perceived risks, uncertainty, and trust deficits. Neuromarketing provides tools to capture these processes more deeply by analysing physiological and neurological responses to communication stimuli (Couwenberg et al., 2016). Techniques, such as functional magnetic resonance imaging, electroencephalography, eye-tracking, and biometric measurements allow for the identification of attention patterns, emotional activation, and cognitive load associated with specific communication strategies.

The results indicate that neuromarketing contributes to a more precise understanding of how stakeholders process information about environmental risks, project impacts, and organisational intentions. This is particularly important in situations where rational arguments alone are insufficient to influence stakeholder attitudes. By incorporating emotional and subconscious dimensions into the analysis, neuromarketing enhances the ability to design communication strategies that are more effective, targeted, and responsive to stakeholder concerns (Nilashi et al., 2020). In this context, neuromarketing should not be understood as a replacement for traditional marketing approaches, but rather as a complementary analytical tool that increases the explanatory power of stakeholder behaviour models and improves the effectiveness of communication in complex project environments.

Integration of neuromarketing into holistic marketing: towards a holistic neuromarketing framework

The synthesis of findings reveals that integrating neuromarketing into holistic marketing is not a paradigm shift but an evolutionary development of the existing framework. Holistic marketing provides the structural and strategic foundation, while neuromarketing introduces an additional analytical layer focused on cognitive and emotional processes.

This integration can be observed across all dimensions of holistic marketing. In internal marketing, neuroscientific insights support more effective management of employee behaviour, motivation, and communication, thereby improving organisational performance and coordination (González-Morales et al., 2024). In integrated marketing, neuromarketing enhances the design of communication strategies by identifying which stimuli generate attention and emotional engagement. In relationship marketing, incorporating neuropsychological principles enables a deeper understanding of stakeholder interactions, facilitating more personalised and effective engagement (Shaw, 2017). In socially responsible marketing, the emergence of neuroethical considerations highlights the importance of transparency, data protection, and ethical use of neuroscientific tools in influencing stakeholder behaviour (García et al., 2025). The applicability of this framework is particularly evident in resource-based sectors, where project implementation is frequently conditioned by stakeholder acceptance and the ability to communicate environmental risks and mitigation measures effectively.

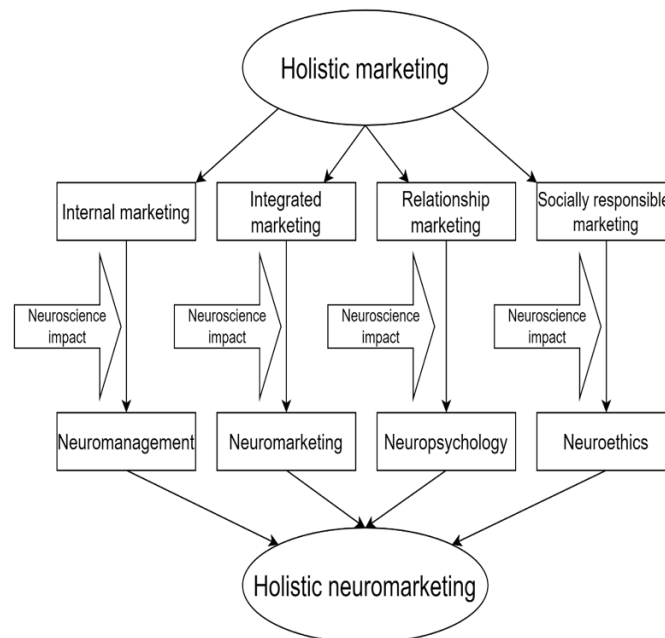


Figure 1. Application of Neuroscience to Holistic Marketing

Source: own elaboration

Figure 1 illustrates the conceptual integration of neuroscience into the four core dimensions of holistic marketing. It demonstrates how neuroscientific insights transform individual marketing components into specialised domains—neuromanagement, neuromarketing, neuropsychology, and neuroethics—which collectively form an extended holistic neuromarketing framework. This integrated model captures the interaction between communication processes, cognitive-emotional responses, and stakeholder behaviour in environmental and resource-based systems.

The interconnection of these elements results in an extended conceptual framework known as holistic neuromarketing. This framework integrates systemic marketing principles with neuroscience insights, enabling a more comprehensive analysis of stakeholder behaviour and communication processes in environmental and resource-based projects. It reflects the need to move beyond purely rational models of decision-making and to incorporate behavioural and cognitive dimensions into the management of complex socio-technical systems.

The proposed framework provides a structured basis for improving communication effectiveness, reducing stakeholder resistance, and enhancing project acceptance. In environments where social licence to operate is critical, integrating neuromarketing into holistic marketing offers a new perspective on how organisations can manage stakeholder relationships and address the challenges posed by environmental uncertainty and societal expectations (Jijelava and Vanclay, 2018; Wiesner and Dargusch, 2022).

5. Discussion

The findings of this study indicate that the relationship between holistic marketing and neuromarketing should not be interpreted as a paradigm discontinuity, but rather as an evolutionary transformation driven by the integration of neuroscientific insights into established marketing frameworks. Holistic marketing remains conceptually stable in its core dimensions—internal, integrated, relationship, and socially responsible marketing—however, its functional application is significantly extended through the incorporation of cognitive and affective mechanisms that underpin stakeholder behaviour.

From a theoretical perspective, this shift reflects a broader transition within marketing science from predominantly rational and declarative models of decision-making towards behaviourally informed and empirically grounded approaches. Traditional marketing frameworks assume that stakeholder decisions are largely based on conscious evaluation of information, whereas contemporary research demonstrates that a substantial proportion of decision-making processes is driven by subconscious and affective factors (Alsharif et al., 2021). In this context, neuromarketing provides a methodological bridge that enables the systematic analysis and integration of these latent processes into strategic decision-making.

The distinction between holistic marketing and neuromarketing, therefore, lies not in their objectives but in their methodological and epistemological foundations. Holistic marketing operates at a systemic and strategic level, focusing on the coordination of organisational processes and stakeholder relationships. In contrast, neuromarketing operates at the level of individual cognition and perception, utilising advanced neuroscientific techniques such as functional magnetic resonance imaging, electroencephalography, and eye-tracking to capture physiological and neurological responses to marketing stimuli (Couwenberg et al., 2016). These techniques enable the identification of behavioural patterns that are not accessible through conventional research methods, thereby enhancing the explanatory power of marketing models.

In environmental and resource-based projects, this methodological complementarity acquires particular significance. Stakeholder responses in such contexts are often shaped by perceived risks, uncertainty, and trust deficits rather than purely economic considerations. The concept of social licence to operate highlights the importance of stakeholder acceptance as a critical determinant of project viability (Jijelava & Vanclay, 2018). The integration of neuromarketing into holistic marketing therefore provides a more robust analytical framework for understanding how stakeholders perceive environmental risks, process project-related information, and form attitudes towards project implementation. This is especially relevant in mining and resource-intensive industries, where stakeholder opposition has been shown to significantly influence project timelines, operational continuity, and overall project feasibility. In parallel, recent research points to the growing importance of stakeholder-sensitive approaches in the revitalisation of mining landscapes, geospatial interpretation of mining heritage, and the assessment of environmental risks associated with transformed or vulnerable territories (Hvizdák et al., 2023; Zelenakova et al., 2024; Iannaccone et al., 2024b). For example, in mining projects located in environmentally sensitive areas, neuromarketing techniques can be applied to evaluate stakeholder responses to different communication strategies related to environmental impact mitigation, thereby enabling more effective and adaptive stakeholder engagement.

The proposed concept of holistic neuromarketing can thus be interpreted as a higher-order integrative framework that combines systemic coordination with behavioural depth. It extends traditional marketing by embedding cognitive-emotional variables into the analysis of stakeholder interactions, thereby enabling a more nuanced understanding of communication effectiveness and behavioural responses. This is particularly relevant in complex socio-technical systems, where decision-making processes are influenced by multiple interacting

factors, including institutional context, environmental uncertainty, and socio-cultural dynamics (Wiesner & Dargusch, 2022; Chipangamate et al., 2023).

Furthermore, the integration of neuroscientific approaches introduces important ethical and governance considerations. The emergence of neuroethics underscores the need to ensure transparency, data protection, and responsible use of behavioural insights in influencing stakeholder decisions (García et al., 2025). In environmental contexts, where public trust is often fragile, the ethical application of neuromarketing techniques is critical to maintaining legitimacy and avoiding manipulation. This highlights the necessity of embedding ethical safeguards within the holistic neuromarketing framework, particularly for projects with significant environmental and societal impacts.

From a practical perspective, the results suggest that organisations operating in environmental and resource-based sectors can benefit from integrating neuromarketing insights into their communication strategies. By aligning systemic marketing principles with empirically grounded behavioural insights, organisations can improve the effectiveness of stakeholder engagement, reduce resistance, and enhance overall project acceptance. This integration enables more adaptive, responsive communication strategies better suited to the complexity of contemporary project environments.

At the same time, it is important to acknowledge the limitations of the proposed framework. As a conceptually driven model, it has not yet been empirically validated, and future research should focus on testing the relationships among communication variables, cognitive-emotional responses, and stakeholder behaviour using quantitative methods such as structural equation modelling. Additionally, further research is needed to explore the scalability of neuromarketing techniques in real-world environmental projects, where resource constraints and ethical considerations may limit their practical implementation.

In summary, integrating neuromarketing into holistic marketing represents a significant advancement in understanding stakeholder behaviour in complex project environments. Rather than replacing existing marketing paradigms, it enhances their analytical capacity by incorporating behavioural and cognitive dimensions. The resulting holistic neuromarketing framework provides a theoretically grounded and practically relevant approach for managing stakeholder relationships, improving communication effectiveness, and supporting sustainable project implementation in environmental and resource-based systems.

6. Conclusions

The present study contributes to advancing interdisciplinary research at the intersection of marketing, behavioural science, and environmental project management by conceptualising the integration of neuromarketing into the framework of holistic marketing. The findings confirm that this integration does not constitute a disruptive paradigm shift, but rather an evolutionary extension that enhances the analytical depth and practical applicability of existing marketing approaches. Holistic marketing remains a robust systemic framework capable of addressing the complexity of stakeholder interactions in environmental and resource-based projects. However, its traditional application has been limited by an insufficient consideration of cognitive and emotional determinants of stakeholder behaviour. By incorporating neuroscientific insights, the proposed concept of holistic neuromarketing extends this framework to include subconscious and affective processes that significantly influence perception, trust formation, and decision-making.

From a theoretical perspective, the study advances current knowledge by formalising the relationship between communication processes, cognitive-emotional responses, perceived risk, and stakeholder acceptance within a unified conceptual model. This integrative approach provides a more comprehensive understanding of how stakeholders interpret and respond to project-related information, particularly in contexts characterised by uncertainty, environmental sensitivity, and conflicting interests.

From a practical standpoint, the findings highlight the potential of neuromarketing techniques to improve communication effectiveness and stakeholder engagement in environmental and resource-based systems. By enabling a more precise identification of behavioural responses and emotional reactions, organisations can

design more targeted and adaptive communication strategies, thereby reducing stakeholder resistance and increasing the likelihood of achieving social licence to operate. This is particularly relevant in projects where public perception and trust represent critical success factors. This is particularly important in environmental and resource-based projects, where the success of project implementation is closely linked to the ability to secure and maintain a social licence to operate.

At the same time, the integration of neuroscientific approaches raises important ethical considerations. The application of neuromarketing in stakeholder communication must be guided by principles of transparency, responsibility, and data protection to ensure that behavioural insights are used ethically. The incorporation of neuroethical principles into the holistic neuromarketing framework is therefore essential for maintaining legitimacy and public trust, especially in environmentally sensitive contexts.

Despite its contributions, the study has certain limitations. The proposed framework is conceptual in nature and has not been empirically validated. Future research should focus on testing the model using quantitative methods, such as structural equation modelling, to examine the strength and direction of relationships between key variables. Furthermore, additional research is needed to assess the practical feasibility and scalability of neuromarketing techniques in real-world environmental projects, considering economic, technical, and ethical constraints.

Integrating neuromarketing into holistic marketing offers a promising direction for enhancing stakeholder relationship management in complex socio-technical systems. The concept of holistic neuromarketing provides a theoretically grounded and practically relevant framework that supports more effective communication, improved stakeholder acceptance, and more sustainable project implementation. As environmental and resource-based projects continue to operate in increasingly complex and uncertain environments, such integrative approaches will play a critical role in bridging the gap between technological feasibility and societal acceptance.

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Funding: This paper was published as an output of the project VEGA 1/0392/23: Changes in the approach to creating distribution management concepts for companies affected by the impacts of social and economic crises caused by the global pandemic and increased security risks, no. V- 23-230-00 of the University of Economics in Bratislava.

Data Availability Statement: More primary data can be obtained from the corresponding author on a reasonable request.

Author Contributions: All authors contributed equally. All authors have read and agreed to the published version of the manuscript.

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