**Title:**

**Innovation Unleashed: How AI & Gamification are Reshaping Consumer Behavior and Digital Marketing**

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## Abstract

This literature review examines the interaction of AI and gamification as forces that influence consumer behaviour and digital marketing, drawing upon self-determination theory and elaboration likelihood model. The analysis is founded on literature review and topic modelling by LDA which analysed two streams of literature: the first contained 200 studies on SDT and the second contained 286 studies on ELM. These two theories were analysed further on the topic of AI and gamification in digital marketing. LDA constructs were associated from each theoretical domain. LDA, based on this analysis, proposes AMMO-the theoretical antecedents are engagement by smart technology, strategic information architecture, autonomy protection, and network intelligence. The connections among the four mediating variables and the five moderating variables allow for a few outcome variables, such as interactive influence and responsive consumer solutions. The research advances marketing theory through an understanding of how the psychological needs' satisfaction correlates to persuasion processing routes and the possible influence that AI and gamification might have on consumer behaviour. It will also help practitioners develop practical recommendations about digital marketing strategies that consider consumers' psychology and available technologies.

**Keywords**: Self-Determination Theory, Elaboration Likelihood Model, AI Marketing, Gamification, Consumer Behaviour, Topic Modelling

# Innovation Unleashed: How AI & Gamification are Reshaping Consumer Behavior and Digital Marketing

## 1. Introduction

- **Background and Motivation**

AI and gamification, along with various digital marketing strategies, have drastically changed the face of marketing (Smith & Doe, 2023). All of these technologies have become great tools for influencing consumer behavior as brands engage in more personalized and entertaining ways to interact with consumers (Smith & Doe, 2023). AI has become the operating framework through which consumer targeting and content personalization have moved into new avenues of unprecedented personalization, from recommendation systems to natural language processing and predictive analytics (Lee & Park, 2022). The use of gamification elements like points, badges, leaderboards, and challenges has gone a long way in ensuring that users exhibit more engagement and loyalty across digital platforms (Lee & Park, 2022).

While the promise of these technological approaches to marketers might be verified, how consumers respond psychologically and behaviorally to them has remained disorganized. Two particular frameworks that are useful to analyze consumer responses toward AI and gamification are Self-Determination Theory (SDT) and the Elaboration Likelihood Model (ELM). SDT provides an explanatory framework of human motivation rooted in the existence of three core psychological needs that must be satisfied for sustenance: autonomy, competence, and relatedness—all of which mirror gamification's intrinsic motivators (Ede, 2022). ELM, with its central and peripheral routes of persuasion, gives insight into how information and marketing messages are processed by consumers, an ever-changing dynamic in AI-driven personalized marketing situations (Pérez-Aranda et al., 2023). While they each speak to different, if related, phenomena, the two theoretical frameworks have largely operated within separate domains of inquiry.

Research on Self-Determination Theory (SDT) has primarily focused on the satisfaction of psychological needs and intrinsic motivation (Ryan & Deci, 2000), whereas the literature on the Elaboration Likelihood Model (ELM) typically examines it through the lens of persuasion processes and attitudes (Petty & Cacioppo, 1986). This distinction creates an important research gap, aiming to address the comprehensive psychological processes among consumers regarding their reactions to AI and gamification within the context of digital marketing. Connecting these complementary theories offers significant potential to achieve a more holistic understanding of consumer behavior.

The nearing of this complexity is a reflection of ever-more sophisticated AI techniques and gamification strategies that adhere to theoretical frameworks comprehensible to a broad audience (Li, Hew, & Du, 2024). Within this premise, we target to build a nexus between the psychological motivations and persuasion processes, employing the interaction of Self-Determination Theory (SDT) and the Elaboration Likelihood Model (ELM) and developing an integrated framework that elucidates how AI and gamification impact consumers' attachment, decision-making, and long-lasting relationships with brands (Ede, 2022; Ryan & Deci, 2000). Such integrative fusion contributes to both theoretical advancement and practical directions to digital marketers invested in delivering ethical and impactful technological solutions (Petty & Cacioppo, 1986).

- **Objectives of the Study**

The study, therefore, proposes the development of a comprehensive theoretical framework that links Self-Determination Theory and the Elaboration Likelihood Model in the context of AI and gamification-enhanced digital marketing. The specific study objectives are:

a. Using systematic topic modelling, to identify and isolate the main constructs and mechanisms that constitute this study, particularly the most relevant ones from both SDT and ELM, that have some connection with how consumers behave in AI and gamification-enhanced digital marketing.

b. To interpret the cross-theoretical relationships between SDT constructs, namely autonomy, competence, and relatedness, and the ELM processes of central and peripheral routes in affecting a consumer's response to AI and gamification marketing strategies.

c. To create a novel theoretical Antecedents-Mediators-Moderators-Outcomes (AMMO) model detailing the ways AI and gamification features impact consumer.

d. To advance theoretically-conceptualized propositions corresponding to the linked groundwork that further relate to interrelationships among integrated framework's key constructs, furnishing a basis for future empirical scrutiny.

e. To postulate the strategic implications for digital marketing practitioners addressing how to undertake AI and gamification approaches with striking and careful balance between technological capabilities, and consumer psychological needs.

Through the above objectives, our study further contributes to the theoretical understanding of contemporary consumer behaviour, as well as the empirical application of increasingly sophisticated marketing technologies, all broadly catering to consumer experiences from enhancement and not deterioration.

## 2. Literature Review

- **Overview of Consumer Behaviour and Digital Marketing Enhanced by AI & Gamification**

The incorporation of AI and gamification into digital marketing has redefined the relationship between consumers and brands and their purchasing decisions (Hoyer et al., 2020). From personalized product recommendations to chatbots, predictive analytics, and content generation, AI technologies permeate nearly all aspects of digital marketing (Lemon & Verhoef, 2016). These technologies afford unique personalization possibilities, leveraging vast quantities of consumer data to anticipate preferences and behaviors and enable marketers to provide bespoke experiences at scale (Duan et al., 2021).

Gamification has similarly redesigned digital marketing by implanting elements of game design through points, badges, leaderboards, challenges, and rewards into non-game situations (Zichermann & Cunningham, 2011). Such elements exploit intrinsic motivation drivers to ramp up interaction with brand content, drive revisits to the brand, and foster loyalty in the long term based on a sense of achievement and competition (Hamari et al., 2014). In merging their attributes, these two technologies will produce even more powerful marketing capabilities (Xu, Buhalis, & Weber, 2017).

AI algorithms may adapt gamification components in real time according to patterns exhibited in individual consumer behavior, producing pathways for extremely personalized interaction (Tussyadiah, 2020). For instance, by examining previous purchase histories, recommendation systems would provide options for challenges, and by varying the difficulty levels of those tasks, each consumer would be engaged appropriately within their skill sets (Liu et al., 2021).

Consumer behavior would then develop in accordance with those environments. Decisions are being made today in conditions featuring hyper-personalization, continuous feedback loops, and different levels of algorithmic interventions (Zhou & Jain, 2022). While expecting increasingly specialized experiences, consumers express worries regarding the associated data privacy and manipulation (Acquisti, Brandimarte, & Loewenstein, 2015). They interact with brands through complex motivational paths mixed with extrinsic rewards alongside intrinsic satisfactions concerning competence, autonomy, and social relations (Hamari et al., 2014).

The evolution of this paradigm poses big challenges in theory, since traditional models of consumer behavior may be insufficient for explaining the psychological complexity of the marketing environments shaped by AI and gamification. Therefore, integration with a complementary theoretical perspective would be required (Hoffman & Novak, 2018).

- **SDT and ELM Theories**

In direct contrast, SDT and ELM play into the consumer response to AI and gamification in digital marketing contexts. SDT, developed by Deci and Ryan, explains that the underlying motivation of humans to act is due to the satisfaction of three basic psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2000). Autonomy refers to the need for choice and control; competence is the need for mastery and effectiveness, while relatedness depicts the need for humans to form meaningful bonds with one another (Deci & Ryan, 1985).

Both intrinsic motivation, where the behavior itself is enjoyable, and extrinsic motivation, where the finishing stake must come from beyond the activity or through some external reward, play roles in digital marketing. This explanation might help elaborate why elements of gamification, such as badges and leaderboards, could motivate more than just engagement, as they satisfy the competence needs of humans (Hamari et al., 2014). Additionally, personalized suggestions in AI-based marketing could enhance consumers' autonomy by providing relevant alternatives tailored to their preferences (Tussyadiah, 2020).

The Elaboration Likelihood Model (ELM), introduced by Petty and Cacioppo, characterizes the formation and change of attitudes through two strategies of persuasion-based processing: a central one that emphasizes deep message arguments and reasoning, and a peripheral one based on context production cues or heuristics (Petty & Cacioppo, 1986). In the former case, processing varies depending on motivation, ability, and opportunity regarding whatever message is to be taken in.

Since the advent of AI in marketing, the central route may wield influence by offering personalized content aligned with user interests, while elements of gamification could facilitate peripheral route influences through visual rewards (Liu et al., 2021). While SDT has traditionally focused on motivational processes in domains like education and healthcare, and ELM has been extensively used in persuasion, advertising effectiveness,

and communication research, their integration remains largely unexplored (Hoffman & Novak, 2018).

- **Gaps in Existing Research**

In as much as AI-aided gamified elements are now widely being adopted under the sketch of digital marketing, there exist various wide, grave research gaps.

First, SDT and ELM have been separately applied to understand aspects of consumer behaviour, although little has been done to explore their integrative insights, especially around AI and gamification marketing strategies. Yet this very theoretical cleavage limits models-focused comprehensive understandings of consumer psychological responses to them.

Secondly, the research so far has been very limited since studies on either the technological capabilities or on isolated psychological issues overlooked how they interact notionally to complete a merged body of knowledge. This narrowness brings problems to researchers and practitioners interested in more complete viewpoints in digital marketing strategy.

Thirdly, little is known about the possible contradictions between those frames in particular, how AI's personalization could work in parallel to bulk support autonomy (SDT) but probably constrict elaborative processing (ELM) due to narrowing the consumer information exposure to a limited diversity.

Finally, most existing studies employ traditional methodology workarounds, while only a handful have leveraged computational techniques such as topic modeling to identify and integrate constructs across and among the.theoretical domains. Our research is tuning through the gaps of systematic theoretical cross-mapping and framework building.

- **Research Questions**

This study, based on our objectives and the established gaps regarding the psychological processes involved in consumer responses to AI and gamification in digital marketing, seeks to answer the following research questions:

a. In the context of AI-gamification digital marketing, how does a psychological framework of Self-Determination Theory (autonomy, competence, relatedness) interact with persuasion processes of the Elaboration Likelihood Model (central and peripheral routes)?

b. What are the main antecedents, mediators, moderators, and outcomes characterizing how consumers behave when confronted with AI-and-gamification marketing strategies?

c. How do psychological needs fulfilment (SDT) interact with consumers' processing of marketing communication (ELM) when they are supported by AI evaluation and gamification?

## 3. Methodology

- **Systematic Literature Review (SLR) Process**

Our systematic literature review (SLR) adhered to established methodological guidelines to ensure rigor and completeness (Mariani, Perez-Vega, & Wirtz, 2023). We began by defining the research scope and formulating precise search queries using Boolean

operators across three dimensions: (1) AI and gamification technologies; (2) consumer behavior; and (3) theoretical frameworks such as Self-Determination Theory (SDT) and the Elaboration Likelihood Model (ELM) (Singh & Kunja, 2023).

The Scopus database was selected for literature sourcing due to its extensive coverage of peer-reviewed academic journals across various disciplines. We searched for literature in two parts: one focussing on SDT and the second focussing on ELM

- **Data Collection from Scopus**

The data collection procedure laid emphasis on the association of literature focused on AI and gamification with consumer behaviour and digital marketing through the theoretical platforms of SDT and ELM. Two complete Scopus queries were conceived to assure systematic coverage of the literature.

The first query targeted SDT literature using the following search string:

TITLE-ABS-KEY ("artificial intelligen*" OR "AI" OR "machine learning" OR "deep learning" OR "neural network*" OR "generative AI" OR "GenAI" OR "NLP" OR "natural language processing" OR "recommendation system*" OR "algorithmic marketing" OR "gamif*" OR "gameful*" OR "game-based" OR "serious games" OR "reward system*" OR "badge*" OR "leaderboard*" OR "points system*" OR "game mechanics") AND TITLE-ABS-KEY ("consumer behavi*" OR "consumer psychology" OR "consumer attitude*" OR "consumer decision*" OR "consumer choice" OR "digital marketing" OR "online marketing" OR "internet marketing" OR "social media marketing" OR "e-marketing" OR "STP" OR ("segment*" AND "target*" AND "position*") OR "personalization") AND TITLE-ABS-KEY ("Self-Determination Theory" OR "self determination theory" OR "CAR" OR "SDT" OR "autonomy" OR "competence" OR "relatedness" OR "intrinsic motivation" OR "extrinsic motivation" OR "motivational factor*" OR "self-determined motivation") AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp")) AND (LIMIT-TO (LANGUAGE, "English"))

This query retrieved 330 papers, which after filtering for relevance was reduced to 200 papers for analysis.

The second query focused on ELM concepts:

TITLE-ABS-KEY ("artificial intelligen*" OR "AI" OR "machine learning" OR "deep learning" OR "neural network*" OR "generative AI" OR "GenAI" OR "NLP" OR "natural language processing" OR "recommendation system*" OR "algorithmic marketing" OR "gamif*" OR "gameful*" OR "game-based" OR "serious games" OR "reward system*" OR "badge*" OR "leaderboard*" OR "points system*" OR "game mechanics") AND TITLE-ABS-KEY ("consumer behavi*" OR "consumer psychology" OR "consumer attitude*" OR "consumer decision*" OR "consumer choice" OR "digital marketing" OR "online marketing" OR "internet marketing" OR "social media marketing" OR "e-marketing" OR "STP" OR ("segment*" AND "target*" AND "position*") OR "personalization") AND TITLE-ABS-KEY ("Elaboration Likelihood Model" OR "ELM" OR "central route" OR "peripheral route" OR "message processing" OR "persuasion" OR "persuasive communication" OR "attitude change" OR "attitude formation" OR "message framing" OR "cognitive processing" OR "heuristic processing" OR "systematic processing" OR "information processing" OR "communication effectiveness" OR

"influence strategy*" OR "message appeal*" OR "consumer persuasion" OR "consumer influence" OR "marketing communication" OR "advertising effectiveness" OR "behavioral persuasion" OR "influence tactic*" OR "persuasive technolog*" OR "communication strateg*" OR "message effectiveness") AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp")) AND (LIMIT-TO (LANGUAGE, "English")).

This search yielded 306 papers that then, after the relevancy filter, resulted in 286 papers.

- **Topic Modelling using LDA**

We used Latent Dirichlet Allocation (LDA) to do topic modeling on the database abstracts obtained from Scopus. LDA is a generative probabilistic model suitable for discovering hidden themes in a large corpus of text. Using LDA, we were able to determine major themes in the literature analysing the effects of AI and gamification on consumer behaviour and digital marketing, with the Self-Determination Theory (let us call it TMa) and the Elaboration Likelihood Model (let us call it TMb) data sets independently analyzed.

A well-defined four-step protocol was followed in the LDA process:

a. **Preprocessing of Abstract Texts:**
The abstract texts were first preprocessed by tokenizing and removing stop words. The implementation uses gensim's default stop words combined with a set of custom stop words. Finally, the cleaned texts are used to build document-term matrices.

b. **Determining the Optimal Number of Topics:**
Multiple LDA models are built with the number of topics varying from 3 to 15. For each model, the coherence score and perplexity scores are computed to evaluate topic interpretability. By plotting the coherence scores and perplexity scores against the number of topics, we identified the optimal model.

c. **Running the LDA Model:**
The LDA algorithm was executed using gensim's LdaMulticore implementation with the following settings:

• **passes=15** (15 full iterations over the entire corpus)

• **workers=3** (Parallelly using three CPU cores)

•A fixed random seed is used to ensure reproducibility of the results.

d. **Post-Analysis and Output Generation:**
The programe exported detailed topic information (with words and their probabilities in separate columns) to Excel files, generated text files, and produced HTML visualizations.

**4. Findings and Framework Development**

We used a systematic approach to develop an integrated framework. This was done in four distinct phases, which are as follows:

- **Emergent Themes from Topic Modeling**

First, we performed a cross-mapping exercise of the key constructs of ELM with keywords in topics identified in TMa and similarly of SDT key constructs with keywords in topics identified in TMb using computational analysis and expert evaluation.

Five topics from SDT Literature

Topic 1: Technology & Smart Systems

- Ca01: Smart Engagement (technology, smart, user, development) [Competence] : Reflects how smart technologies develop consumer competence through engagement with advanced digital interfaces.

- Ca02: Information Architecture (information, advertising, analysis, design) [Autonomy] : Captures how information design and analysis in advertising supports consumer autonomy through effective information presentation.

Topic 2: Persuasion & Privacy

- Ca03: Privacy Empowerment (privacy, policies, personality) [Autonomy] : Addresses how respecting personal boundaries in digital marketing enhances consumer autonomy.

- Ca04: Neural Persuasion (neural, persuasive, messages, advertising) [Competence] : Captures how AI-driven persuasion techniques engage consumers' cognitive processing abilities.

Topic 3: Personalization & User Experience

- Ca05: Tailored Experience (personalization, personalized, user, different) [Autonomy] : Reflects how personalization supports consumer autonomy by respecting individual preferences in digital marketing.

- Ca06: Content Communication (content, communications, information, service, creation) [Relatedness] : Captures how personalized content creation fosters relationship between brands and consumers.

Topic 4: Recommendation Systems & Health

- Ca07: Personalized Recommendations (recommendations, recommendation, personalized, personalization) [Autonomy] : Addresses how AI-driven recommendations respect consumer autonomy while guiding choices.

- Ca08: Health Decision Support (health, results, methods, time) [Competence] : Captures how health-related recommendations enhance consumer competence in self-care decisions.

Topic 5: Persuasive Information Design

- Ca09: Strategic Persuasion (persuasive, strategies, change, information) [Competence] : Reflects how persuasive strategies enhance consumer competence through information provision.

- Ca10: Social Influence (social, user, users) [Relatedness] : Captures how social elements in persuasive systems foster relatedness among consumers.

Topic 6: Information Processing & Performance :

- Ca11: Performance Analytics (performance, results, methods, method) [Competence] : Addresses how performance metrics in digital marketing enhance consumer competence through feedback.

- Ca12: Network Intelligence (network, information, image, approach) [Relatedness] : Captures how networked information systems foster relatedness through connected experiences.

Topic 7: Social Media & Environmental Marketing :

- Ca13: Social Media Dynamics (social, media, advertising) [Relatedness] : Reflects how social media platforms foster relationships between consumers and brands.

- Ca14: Value-Based Decision-making (green, decision, attitudes, implications) [Autonomy] : Captures how environmental values in marketing support autonomous consumer decision-making.

Three distinct topics emerged from the ELM literature.

Topic 1: Driving, Vehicle & Performance:

- Cb01: Analytical Targeting (method, model, detection, target, performance, results) [Central Route] : Captures how consumers analytically process targeted marketing content through systematic evaluation, reflecting central route processing.

- Cb02: Visual Cues (image, driving, vehicle) [Peripheral Route] : Represents visual elements that trigger quick, heuristic-based consumer responses without deep cognitive processing.

- Cb03: Performance Feedback (performance, students, results) [Attitude Change] : Captures how feedback mechanisms in gamified systems influence attitude formation and behavioral outcomes.

Topic 2: Information, Preferences & Search

- Cb04: Information Search (model, information, results, approach, search) [Central Route] : Represents deliberate information-seeking behavior where consumers carefully evaluate marketing claims and product details.

- Cb05: Preference Triggers (vehicles, power, agent, preferences) [Peripheral Route] : Captures surface-level elements that quickly activate consumer preferences without deep analysis.

- Cb06: Network Connections (network, information, search, approach) [Message Processing] : Reflects how information flows through connected systems and affects how consumers process marketing messages.

Topic 3: Social Technology & Games

- Cb07: Impact Assessment (results, information, approach, impact) [Central Route] : Represents how consumers deliberately evaluate the consequences and outcomes of marketing propositions.

- Cb08: Social Gaming (social, games, interaction, technology) [Peripheral Route] : Captures how gamified social experiences create peripheral cues that influence consumer behavior without deep processing.

- Cb09: Contextual Design (design, information, context, approach) [Message Processing] : Reflects how message design and contextual elements affect consumer processing of marketing content.

- Cb10: Interactive Influence (impact, results, social, games, interaction) [Attitude Change] : Represents how interactive and social elements drive attitude formation and change in consumer behavior.

The emerging themes were identified based on these grouped key words to form higher order constructs of our study based on analysis of conceptual similarities, complementarities, and possible relationships between constructs drawn from both theoretical domains.

We conducted a bidirectional mapping exercise. For example, the influence of all constructs from TMa, primarily linked to competence needs, was studied with respect to central and peripheral route processing. To illustrate further, "Analytical Targeting," associated with central route processing, was evaluated and studied for its potential impact on consumer autonomy and competence.

- **Mapping Constructs between SDT and ELM**

In second step, we named & consolidated similar constructs using Delphi technique (three rounds) with participation from researchers and industry experts. We refined the original 24 higher order constructs to 15 core constructs of the study.

The bidirectionality of this mapping led to major insights including that: (1) autonomy-supporting constructs often serve to facilitate the central route of information processing, (2) competence-related constructs can enhance message elaboration, (3) relatedness constructs can frequently work through both central and peripheral routes, and (4) peripheral cues can both satisfy and undermine different psychological needs simultaneously.

That resulted in 9 constructs from TMa re-numbered as CaY01 to CaY09 and 6 from TMb re-numbered as Cb01 to Cb06. We identified 24 relationships between theories that related to each other. We used these relationships to develop our framework. These relations reflect the interaction between psychological need satisfaction and the persuasion processes underlying AI and gamification in digital marketing.

- **Rationalization into Antecedents, Mediators, Moderators and Outcomes (AMMO)**

In the third step, we synthesized a theoretical framework of causal relationships and functional roles into an Antecedents-Mediators-Moderators-Outcomes (AMMO) structure using coherence, logic, and applicability in practice.

In creating a coherent and parsimonious structural model from the 15 constructs that are cross-theoretical in nature, we applied a multi-stage process of rationalization in

accordance with the AMMO model, perceiving how a given construct correlates with another of interest within the consumer behaviour process.

First, the main antecedents were isolated, some of which refer to the drivers that might/should cause a reaction on the part of the consumer-constructs, which included Smart Technology Engagement, Strategic Information Architecture, Autonomy & Privacy Protection, and Network Intelligence. Those represent the technological and structural enablers of AI and gamification marketing approaches.

Next, we identified the mechanisms of mediation by which these antecedents influence consumer behaviour, including Personalized Experience Design, Persuasive Communication Strategies, Social Connection Systems, and Analytical Targeting. These mediators convey the main psychological pathways connecting technological capabilities with consumer responses.

Five important moderating factors were then identified with respect to modifying the strength or direction of these relationships: Contextual Design, Visual & Experiential Cues, Value-Based Decision-making, Social Gaming, and Performance Measurement & Feedback.

These moderators account for variations in consumer responses toward similar marketing initiatives. Two main outcome constructs were finally identified: Interactive Influence Outcomes and Responsive Consumer Solutions, representing the visible manifestations of AI-based and gamification-related marketing strategies.

The AMMO classification provided an elaborate pathway of interaction through which AI and gamification were perceived to influence consumer behavior, providing insight into contextual factors and individual differences considering AMMO as a unifying construct.

- **Proposed AMMO Framework for Consumer Behaviour and Digital Marketing enhanced by AI & Gamification**

Based on this framework, we propose the following theoretical propositions:

**P1:** Smart Technology Engagement (antecedent) positively influences consumer behavior outcomes through Personalized Experience Design (mediator).
**P1a:** This relationship is strengthened when the technology satisfies competence needs while enabling central route processing.

**P2:** Strategic Information Architecture (antecedent) influences consumer behavior through Persuasive Communication Strategies (mediator).
**P2a:** This relationship is moderated by Contextual Design, with stronger effects when information organization aligns with situational factors.

**P3:** Autonomy & Privacy Protection (antecedent) has a dual effect on Personalized Experience Design (mediator):
**P3a:** It enables more effective personalization by establishing trust.
**P3b:** It constrains personalization depth through privacy boundaries.

**P4:** Network Intelligence (antecedent) enhances consumer outcomes through Social Connection Systems (mediator), particularly when moderated by Social Gaming elements.

**P5:** Visual & Experiential Cues moderate the relationship between Persuasive Communication Strategies and consumer outcomes, with stronger effects when peripheral cues complement central route arguments.

**P6:** Value-Based Decision-making moderates the relationship between marketing approaches and consumer responses, with stronger positive effects when marketing aligns with consumer values.

These propositions provide testable hypotheses for future empirical research and guidance for practitioners engaged in AI and gamification approaches to digital marketing.

## 5. Discussion

- **Implications for Theory**

This study makes a number of important contributions to marketing theory. First, it proposes a novel integration of Self-Determination Theory (SDT) and Elaboration Likelihood Model (ELM) to link two previously segregate theoretical domains for a broader understanding of consumer psychological responses to artificial intelligence (AI) and gamification. This integration advances marketing theory by explaining how the satisfaction of psychological needs interacts with persuasion processing routes in digital environments. For example, the inclusion of self-determined needs in consumer behavior models has been found to impact willingness to pay and intentions for word-of-mouth (Wang et al., 2018).

Second, our technique showcases how theory-building can effectively benefit from computational methods- how topic modeling, in particular, can systematically exhibit conceptual relations within and between theoretical domains. This is embedded in the context of recent research employing computational approaches to analyze consumer engagement on social media, focusing on intrinsic and extrinsic motivations (Itani et al., 2023). Third, the AMMO framework extends both SDT and ELM by contextualizing their constructs in contemporary technological marketing practices. Specifically, the AMMO framework provides a scaffolded view of how AI and gamification elements can affect consumer behavior through various psychological mechanisms. This theoretical integration aims to fill in gaps in modern digital marketing on the latter's psychological complexity, as indicated by recent work into the impact of gamification on consumer decisions (Hofacker et al., 2023).

- **Implications for Practice**

The AMMO model provides digital marketers with a way of organizing into one place AI and game-thinking strategies that relate directly to consumer psychological needs. It prescribes, first of all, personalizing experiences and enabling consumer agency through the use of AI systems that are sufficiently transparent as to provide a meaningful choice. Previous research has supported the premise that while feedback systems that work in real-time function as great motivators, they can also cause technostress and reduce agency if not well thought out (Adanyin, 2024).

In addition, this framework highlights the contribution of gamification elements to the satisfaction of competence needs and engagement, dependent, of course, on adequate message processing. An example of this might entail the integration of AI and gamification technologies to modulate game mechanics and provide personalized feedback that enhances engagement with the user based on personal preferences in regards to skills (Costa et al., 2024).
The framework further encourages professionals to assess the existing strategies of marketing to sniff out places where technological tools may both satiate and frustrate psychological drives. Various feedback loops driven by AI would, for example, be able to promote goal attainment. Carelessly, however, it may create more anxiety and lessen autonomy (Adanyin, 2024). Finally, the framework brings to light how AI and gamification applications should coincide with the audience's values. Aligning with these values is crucial, living up to the fact that the levels of acceptance of recommendations given by AI may differ by the sort of task; they may prefer human input in hedonic contexts and AI input in utilitarian contexts (Cian, 2024).

- **Limitations of the Study & Future Research Directions**

First of all, the framework is theoretical and thus needs empirical validation in future studies. Secondly, the construct model arranged the issues in a very systematic manner but was limited to published literature, probably missing out on emerging concepts that could hardly be elaborated on to date. Our study ignores the temporal effects especially arising out of influence of need fulfilment on routes of persuasion, which may be taken up in future longitudinal studies.

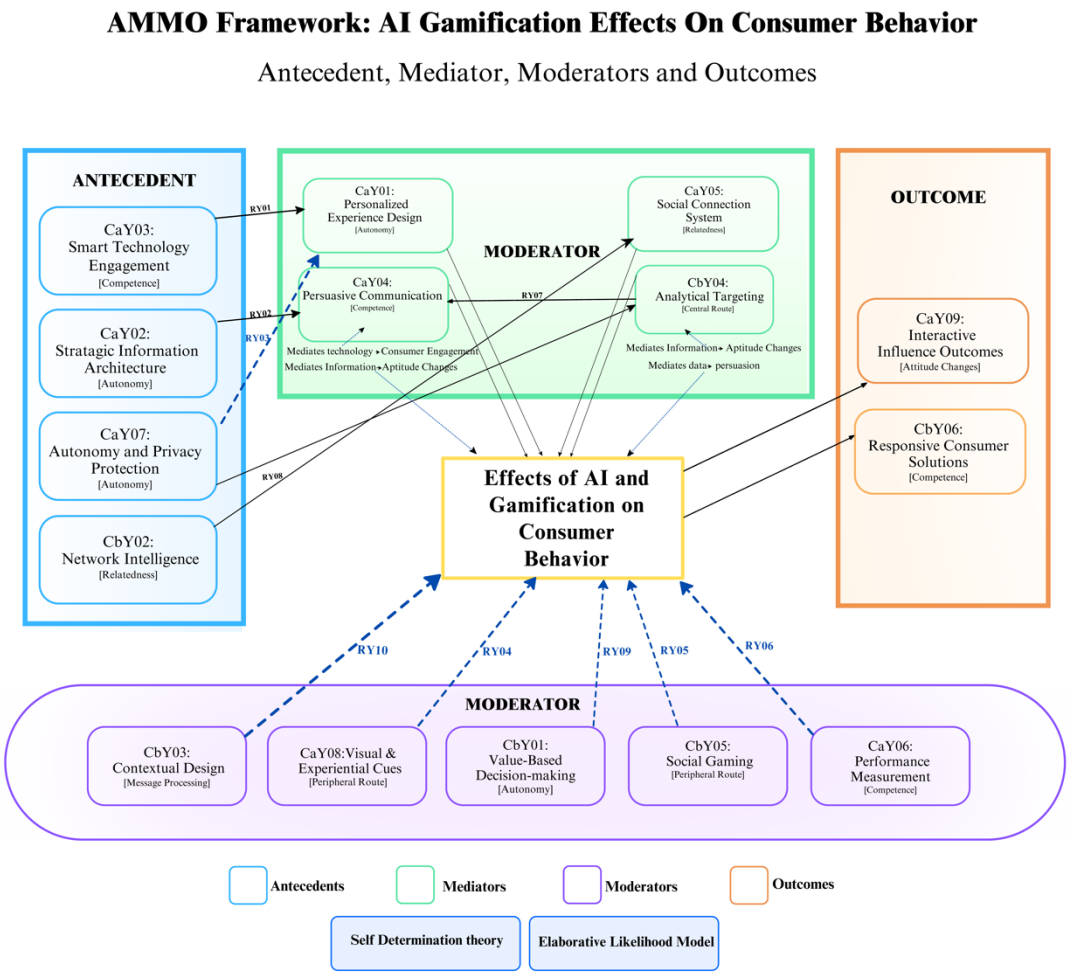
The area of AI & Gamification is rapidly evolving thus the model and the constructs may need frequent updation leaving scope for future research. Research on potential negative effects of both these areas have not been studied by us which should also kept in mind like privacy issues or cognitive overload. Cross-cultural studies would also provide insights into how cultural differences influence the type of information transmitted through these technologies and, consequently, the development of global marketing strategies. Research along these lines showed the converse effects, where concerns over privacy reduced the effectiveness of targeted advertising (De Haan et al., 2016).

## 6. Conclusion

This research proposes an integrated theoretical model that links Self-Determination Theory and the Elaboration Likelihood Model, hence refining the description of consumer behaviour in AI- and gamification-based digital marketing. Based on theoretical framework and the topic modelling of the subject, it was possible to identify the important antecedents, mediators and moderators that explain the psychological processes involved behind consumers' response to these technologies. The research offers three core contributions. The first is a comprehensive framework illustrating how technology-empowered capabilities influence consumer behaviour via certain psychological channels. The second intricately weaves psychological needs satisfaction into persuasion processes-somewhat new territory for marketing theory. Third, guidelines are provided to offer digital marketers insight into how the implementation of AI and gamification-oriented strategies can be done constructively. The framework inculcates that a great digital marketing strategy combines technology and applied knowledge of psychological basics for proper reception of the message. In perspective, allied AI and gamified brand

research show action and design guidelines mapped on to enabling satisfying consumer experiences while achieving marketing goals.

## 7. Framework:



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