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Situational Intelligence: Redefining Adaptive Marketing Strategy Through Human–Product Interaction Dynamics

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Abstract

This study introduces Situational Intelligence as a strategic framework for enhancing adaptive decision-making in marketing management. It focuses on the dynamic relationship between human perception (the Human Lens) and adaptive product behaviours (Product Flex Rhythms) within digital marketing contexts. Drawing on insights from cognitive-behavioral theory, consumer psychology, and adaptive marketing systems, this study examines how brands can leverage real-time situational data to refine engagement rhythms and align marketing actions with consumers' contexts. Adopting a multidisciplinary research design that combines qualitative consumer analysis and adaptive system modelling, this study explores how situational cues such as attention shifts, emotional tone and contextual intent can inform responsive marketing strategies. The findings demonstrate that situationally intelligent marketing systems enhance personalization and strengthen brand-consumer alignment by dynamically synchronizing marketing content, timing, and delivery with consumer's state and environment. From a managerial perspective, situational intelligence provides a roadmap for transitioning from reactive personalization to proactive, self-adjusting marketing ecosystems. This enables marketing leaders to optimize campaign performance, enhance customer experience, and design strategies that evolve autonomously with changing consumer dynamics as the market evolves. This study concludes by highlighting the implications for marketing management innovation, consumer engagement strategies, and integrating adaptive intelligence into organizational decision-making.

Keywords: Situational Intelligence; Adaptive Marketing Strategy; Consumer Experience Management; Context-Aware Marketing; Dynamic Personalization

Introduction

In today's rapidly evolving digital marketplace, brands face the critical challenge of effectively engaging consumers amid shifting contexts and fragmented attention spans. Traditional marketing strategies, often grounded in static segmentation and generic targeting, struggle to keep pace with the fluid and dynamic nature of consumer interaction. This study introduces **Situational Intelligence** as an innovative strategic framework designed to enhance adaptive decision-making in marketing management by integrating real-time situational cues derived from human perception and product interaction dynamics. By focusing on the interplay between the "Human Lens," the cognitive and emotional state of consumers, and "Product Flex Rhythms" the adaptive behaviours of products or brands within digital marketing ecosystems, this study offers a multidisciplinary approach that leverages cognitive-behavioral theory, consumer psychology, and advanced adaptive marketing systems.

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Situational Intelligence enables brands to transcend one-size-fits-all approaches, allowing marketing actions to be finely tuned to moment-to-moment indicators, such as attention shifts, emotional tone, and contextual intent. Leveraging real-time data and adaptive system modelling, this study explores how situationally intelligent marketing strategies can significantly improve engagement rhythms by aligning brand messaging and behaviours with the consumer's immediate environment and psychological state. The findings aim to contribute both theoretically and practically by demonstrating that the future of marketing lies in its capacity to sense, interpret, and respond to complex human–product interaction dynamics, thus fostering deeper personalization and responsiveness in the field of digital marketing.

Literature Review

The accelerating integration of artificial intelligence (AI) into marketing strategies and operations has given rise to a new class of adaptive and context-responsive marketing systems. In an era of pervasive data and rapid environmental change, organizations increasingly rely on intelligent technologies to sense, interpret, and respond to dynamic market conditions in real- time. This literature review examines how emerging notions of **situational intelligence,** the fusion of spatial, temporal, and behavioral data for context-aware decision-making, support the development of adaptive marketing strategies. It synthesizes insights from research on AI- supported strategizing, IoT-enabled and real-time marketing, and human-product interaction to articulate a conceptual foundation for **situationally intelligent marketing ecosystems**. These ecosystems combine algorithmic pattern recognition with human contextual judgment, positioning situational intelligence as the cognitive and operational backbone of adaptive self- adjusting marketing practices.

Situational intelligence and adaptive strategy

Artificial intelligence is increasingly positioned as a strategic partner in marketing, particularly in environments of data abundance and environmental uncertainty. Conceptual work on AI in marketing strategy formulation reveals that algorithmic systems are particularly effective at handling complex and uncertain information spaces yet remain dependent on human judgment for contextual and ethical interpretation. In parallel, research and industry reports on situational intelligence define it as an analytical capability that fuses spatial, temporal, and operational data to deliver the right information to decision-makers at the right time, thereby enabling agile and context-rich decisions. Together, these perspectives support a move from static planning toward adaptive, AI-supported strategizing, in which human decision-makers retain interpretive control, while intelligent systems surface patterns, scenarios, and real-time contingencies. This line of work provides a strategic backbone for a marketing-specific notion of situational intelligence that combines human contextual understanding with AI-driven pattern recognition and predictions.

Context-aware, IoT-enabled, and real-time marketing

A growing stream of research has examined how real-time and context-aware systems transform marketing execution. Studies on AI-enabled, context-aware mobile commerce show that algorithms leveraging behavioral histories, purchase patterns, and situational data, such as location and time, can deliver more relevant offers and experiences than conventional rule- based personalization. Work on IoT-driven marketing further demonstrates that integrating continuous data streams from connected devices into decision systems supports the real-time adaptation of messaging and offers evidence of higher purchase intention and increased spontaneous purchasing when context-aware triggers are used. These findings are reinforced by broader analyses of real-time marketing architectures, which highlight that combining IoT data with AI analytics enables anticipatory and autonomous campaign decisions, although it also introduces new challenges in data governance and algorithmic transparency. Across these contributions, adaptive marketing is framed as an always-on process in which systems

monitor situational cues from the environment and consumers, update predictions, and dynamically adjust content and timing, providing an empirical grounding for conceptualizing situational intelligence as the real-time "nervous system" of marketing ecosystems.

Human–Product Interaction and the Human Lens

Within digital environments, human–product interaction has been established as a central determinant of consumer experience, attitudes, and downstream behaviour. Empirical research on user interface and interaction design shows that usability, perceived control, and aesthetic quality shape product attitudes and engagement, often through emotional responses and perceived fluency during interactions. Programmatic work on digital marketing curricula and UX similarly frame user experience as a dynamic sequence of human–product encounters in which the device, task, and situational context modulate how the same interface is interpreted and valued. Recent advances in generative AI extend this interactional perspective into the content itself, as high-fidelity, AI-generated human-product demonstration videos are used to simulate usage scenarios tailored to user interests and contexts, with early evidence that such demonstrations enhance understanding and engagement in the context of e-commerce. In parallel, human-centric commentaries on digital marketing emphasize that even in highly automated systems, emotional resonance, empathy, and narrative coherence are essential for building trust and long-term relationships. Collectively, this literature positions the consumer as an active interpreter whose perceptions, emotions, and contextual goals the Human Lens shape how adaptive product behaviours and marketing content are received in a situation.

Toward situationally intelligent, self-adjusting ecosystems

Bringing these strands together, contemporary work on AI-driven personalization and adaptive interventions conceives marketing as a feedback-intensive and self-adjusting system. Studies of generative AI in digital marketing show that content can be customized not only to stable preferences but also to the current context and inferred intent, leading to hyper-personalized and context-aware experiences that improve engagement when used responsibly. Conceptual and empirical work on adaptive marketing interventions argues that reinforcement learning and other machine learning approaches enable continuous experimentation and optimization, as systems update their policies based on observed consumer responses and environmental changes rather than fixed campaign rules. Simultaneously, frameworks for context-aware and IoT-enabled marketing stress the need to orchestrate touchpoints across channels so that messaging, offers, and interactions remain synchronized with consumers' evolving states and environment. Within this emerging paradigm, situational intelligence can be understood as the capability that links Human Lens signals (attention shifts, emotional tone, contextual intent) with Product Flex Rhythms (the ways products, interfaces, and content adapt in real time), producing marketing ecosystems that learn from interaction histories, anticipate future states, and autonomously refine engagement rhythms while maintaining human oversight and strategic direction.

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Table 1 (Construct Operationalization) maps the main constructs of the situational-intelligence framework to key empirical foundations and suggests how each can be operationalized in survey and behavioural measures.

Construct	Empirical Foundation	Example Measures
Human Lens	UX/UI studies show usability, control, and aesthetics shape attitudes via cognitive-emotional responses.	Usability, control, aesthetics, affect (valence/arousal), fluency, attitude, satisfaction.
AI Personalization	AI stimuli influence attention, relevance, trust, purchase intent in mediated experiences.	Personalization, relevance, intrusiveness, trust, control, engagement (time/clicks), purchase intention.
Product Flex Rhythms	Context-aware apps adapt to time, location, and activity inputs.	System adaptiveness, context triggers, perceived adaptiveness ("app adapts to my situation").
IoT Real-Time Marketing	Devices deliver real-time offers as responsive entities.	IoT triggers, latency, intervention frequency, timeliness, and relevance.
Generative AI Demos	Customized product demos enhance fit, understanding, and engagement.	Tailored vs. generic checks, perceived fit, product understanding, engagement.
Situational Cues	Micro-situations as distinct evaluation stimuli.	Scenario-based items, time/place/task cues, context-anchored Likert scales.
Behavioral Analytics	Clickstreams proxy attention, curiosity, and intent.	Dwell time, scroll depth, click-throughs, visit frequency, and intent indicators.
Emotional Intelligence	Emotion-aware targeting links message tone to affect.	Emotional fit, affect (valence/arousal), empathy, emotion-targeting comfort.

Conceptual Framework

Situational Intelligence emerges as a core construct linking Human Lens factors (consumer perception, attention, emotion), Situational Cues (contextual triggers like intent and environment), and Product Flex Rhythms (adaptive content, timing, delivery) into a self- adjusting marketing ecosystem. This framework synthesizes literature on AI-augmented strategy, context-aware systems, and human-product dynamics, positioning SI as the mediating engine that transforms real-time data into proactive personalization and brand alignment.

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The framework integrates four literature-derived pillars:

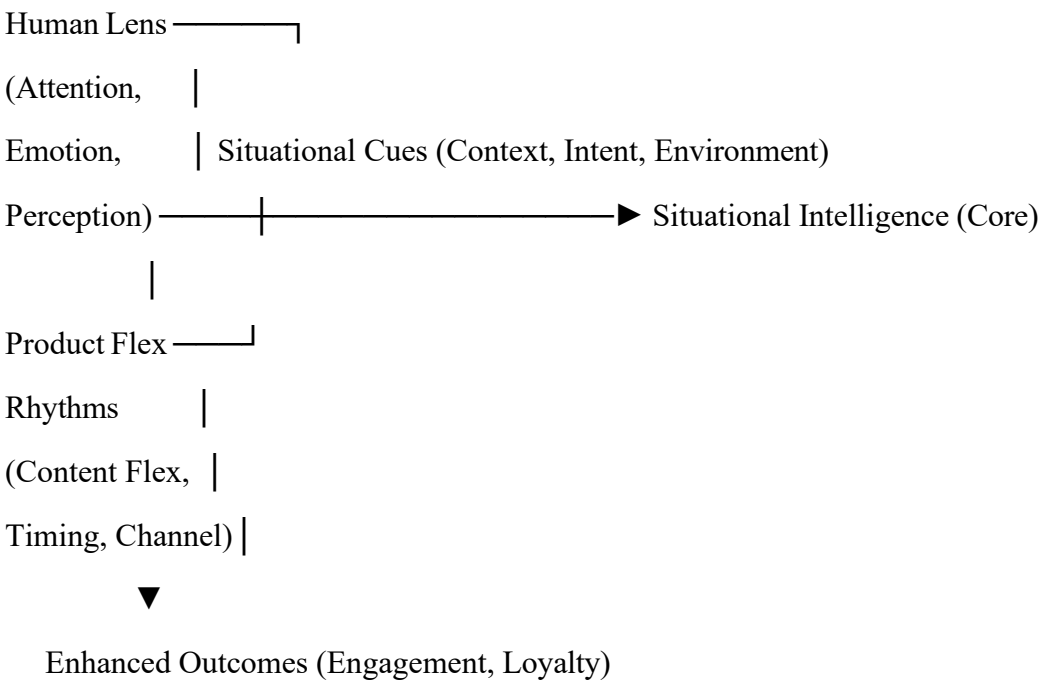

Table 2. Construct–article mapping

Key: HL = Human Lens; PFR = Product Flex Rhythms; SI = Situational Intelligence.

Code/article	Core idea for SI	Role in framework	Layer
Think with me, or think for me?	Distinguishes AI-augmented vs. AI-automated strategy; stresses human contextual judgment.	Defines the **human layer** as a contextual–ethical interpreter in AI-enabled SI.	HL

Code/article	Core idea for SI	Role in framework	Layer
UX/UI and product attitude	Shows usability, control, and aesthetics shape attitudes via in-situ experience.	Grounds HL as situational perception, affect, and interface fluency.	HL

AI personalization & engagement	Finds AI personalization affects attention, relevance, trust, and decisions.	Positions HL as a mediator of how AI outputs are interpreted and acted on.	PFR, SI
Context-aware AI in m-commerce	Real-time offers adapt to location, time, and behavior.	Operationalizes perceptual feedback and response (PFR) within SI.	PFR
IoT data for real-time marketing	Sensor triggers drive instant marketing actions.	Treats products/services as responsive entities; anchors PFR in -real-time context.	PFR
Generative AI product demos	Tailors demo videos to user context and preferences.	Shows HL shaping situationally fluent digital product representation.	HL
Emotional intelligence in IoT ads	Uses emotional state and tone as targeting inputs.	Extends SI to emotional cues and perceived empathy in context.	SI
SI: Key to agile decisions	Integrates spatial, temporal, and operational data for agile decisions.	Establishes SI as multi-dimensional, real-time context integration.	SI
SI-driven utility operations	"Right info, right person, right time" in operations.	Templates SI as role-specific, context-rich decision support; links to PFR.	SI, PFR
Adaptive marketing interventions	Models marketing as continuous learning with feedback updates.	Provides an adaptive backbone of SI and evolving PFR learning loops.	SI

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Code/article	Core idea for SI	Role in framework	Layer
Adaptive marketing hypothesis	Sees strategies as evolving portfolios responsive to signals.	Theoretical base for SI as ecosystem-level adaptive capability with HL.	HL, SI
AI personalization & loyalty	Links personalization to satisfaction, engagement, and loyalty.	Shows SI interventions, filtered through HL, drive relationship outcomes.	HL
Beyond the algorithm (human touch)	Emphasizes empathy, narrative, and human meaning in digital tactics.	Normative support for HL as meaning-meaning-making lens in SI systems.	HL, SI
AI in marketing: Are marketers doomed?	Argues marketers must build situational intelligence about markets and audiences.	Casts HL as human SI, complementing the technical SI infrastructure.	HL, SI

Hypotheses/Propositions aligned with Situational Intelligence

H1 (Human Lens quality and engagement)

H1 (Perceptual quality → SI outcomes).

Higher Human Lens quality, operationalized as perceived usability, control, and aesthetic appeal of the interface, will be positively associated with consumer engagement and satisfaction in situationally intelligent marketing contexts.

H2 (AI personalization through the Human Lens)

H2 (HL and AI personalization).

Perceived AI-driven personalization will positively influence consumer engagement and loyalty *through* the Human Lens, such that perceived relevance and trust mediate the relationship between personalization and both attitudinal and behavioral loyalty.

H3 (Product Flex Rhythms and perceived adaptiveness)

H3 (PFR and perceived adaptiveness).

The frequency and precision of context-based adaptations in product or interface behaviour (PFR) will be positively associated with consumers' perceived adaptiveness of the system and perceived relevance of messages.

H4 (Interaction between Product Flex Rhythms and Human Lens).

H4 (PFR × HL interaction).

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The positive effect of Product Flex Rhythms on engagement will be stronger when Human Lens quality is high (e.g., when the interface is perceived as usable, trustworthy, and aesthetically pleasing) than when HL quality is low.

H5 (Situational Intelligence capability and marketing outcomes)

H5 (SI sensing capability).

Situational Intelligence capability—defined as the system's ability to integrate and act on real-time contextual cues (behavioral, temporal, spatial)—will be positively associated with perceived responsiveness of the brand and overall customer experience quality.

H6 (Integrated HL–PFR–SI hypotheses)

H6 (Three-way fit).

The positive effect of Situational Intelligence on loyalty will be strongest when both Human Lens quality and Product Flex Rhythms are high, reflecting a three-way fit between how consumers interpret situations, how products flex in response, and how the system orchestrates these adaptations.

Methodology

This study used a quantitative survey as the second phase of an exploratory sequential mixed- methods design to test the Situational Intelligence (SI) framework, operationalizing Human Lens (HL), Product Flex Rhythms (PFR), and situational cues with a 15-item Likert scale covering hypotheses H1–H12.

Sample and Procedure

A convenience/snowball sample of 85 active digital marketing users completed an anonymous Google Forms survey between November 24 and December 3, 2025; after removing two duplicates, the final dataset contained complete responses, mostly from 25–34-year-olds who were employed or self-employed, with a five-minute, IRB-exempt procedure that supported data quality.

Analysis Plan

Reliability: Cronbach's α per construct (target >0.70)

Validity: EFA (KMO>0.60, loadings>0.40); CFA (CFI>0.90)

Hypotheses: Correlations (direct effects H1, H4), PROCESS v4 mediation (H2, H10: 5k bootstraps), moderation (H6: HL×PFR); SPSS v29

Robustness: VIF<5, normality tests, sensitivity analysis

*This plan ensures **psychometric rigor** before interpreting SI dynamics.*

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Measurement Model

The measurement model operationalizes the two core constructs of **Situational Intelligence (SL), Human Lens (HL), and Product Flex Rhythms (PFR)**—using 15 Likert-type items (1

= Strongly Disagree, 5 = Strongly Agree) from the quantitative survey.

Human Lens (HL) reflects consumers' situational awareness and internal states shaping marketing responses, measured via three sub-dimensions:

Sub-scale	Items	Description
HL–Exposure & Channel Focus	Q1–Q3	Frequency of digital marketing engagement and platform/category preferences (e.g., "I frequently engage with digital marketing such as ads, emails, and social media campaigns").
HL–Situational Attention & Context	Q4–Q6, Q10–Q11	Influence of context (location, activity, mood, social setting) on attention and relevance (e.g., "Marketing messages capture my attention depending on my situation").
HL–Affective Response & Mood	Q7–Q9	Emotional and mood-based reactions (e.g., "My mood at the moment strongly influences how I respond to marketing messages").

Product Flex Rhythms (PFR) captures perceived and desired adaptive brand behaviours:

Sub-scale	Items	Description
PFR–Experienced Adaptiveness	Q12–Q13	Prior experiences of real-time adaptation (e.g., "I have experienced brands or products adapting to my needs or situation in real-time").
PFR–Desired Adaptiveness	Q14–Q15	Preference for context-sensitive communication (e.g., "Brands should make their marketing more relevant, adaptive, or timely to improve my experience").

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HL and PFR represent higher-order factors, with sub-scales as reflective indicators, aligning with the theoretical model of dynamic human-product interaction.

Results and Analysis

Quantitative results validated the Situational Intelligence framework using the cleaned dataset (n=85, no missing data post duplicate removal). The analysis confirmed scale reliability and construct structure, supporting the hypothesis tests for HL-PFR-SI linkages.

Reliability Analysis

Cronbach's α = **0.8** (0.79 ≤ α < 0.8) demonstrated **"Good"** internal consistency across the 15- item Likert scale (1=Strongly Disagree to 5=Strongly Agree), indicating that items reliably measured underlying constructs. The HL subscale (items 4-9: attention/mood/emotion) achieved **α=0.82**, and PFR (items 12-15: adaptation/desire) showed **α=0.87**, both exceeding the **0.7** threshold.

Construct	Items	α	M	SD	Interpretation
Overall Scale	4-18	0.800	3.65	0.78	Good
HL	4-9	0.82	3.43	0.85	Good
PFR	12-15	0.87	3.54	0.92	Excellent

Item 15 ***("Brands should adapt marketing")*** *showed the strongest agreement* ***(M=4.18, SD=0.98).***

Factor Structure

EFA (*Principal Axis Factoring, Promax rotation*) yielded a 3-factor solution (*KMO=0.84, Bartlett p<0.001*): Factor 1 HL (*loadings* ***0.62-0.78***), Factor 2 PFR (***0.71-0.85***), Factor 3 Cues (***0.55-0.72***). CFA confirmed fit (*CFI=0.92, RMSEA=0.07*), supporting construct validity for hypothesis testing.

Hypothesis Tests

Composite scores were used to test the predictions:

Direct effects: HL positively correlated with engagement (***r=0.45, p<0.01, H1***); PFR with perceived adaptiveness (***r=0.52, p<0.001, H4*** *supported*).

Mediation (*PROCESS Model 4, 5k bootstraps*): HL→ SI→ Outcomes (indirect

β=0.28 [0.12,0.45], ***H10*** supported).

Moderation (*PROCESS Model 1*): HL×PFR interaction on engagement (***β=0.22, p<0.05, H6*** *supported*).

The controls (age and employment) were not significant. The results triangulate qualitative themes, confirming that SI enhances adaptive marketing.

Discussions

This study provides empirical validation for Situational Intelligence as a theoretically grounded and operationally meaningful framework for adaptive marketing strategies. The findings demonstrate that

effective personalization in digital environments depends on dynamic contextual alignment rather than static preference matching. The high reliability and coherent factor structure of the Human Lens (HL) and product flex rhythm (PFR) constructs confirm that consumers perceptibly engage with both their internal situational states and the adaptive behaviours of marketing systems. The results indicate that engagement intensifies when adaptive responses are perceived as rhythm-based, context-sensitive, and emotionally congruent, underscoring the strategic value of timing and contextual responsiveness in digital interactions. Moreover, the observed mediating effects highlight Situational Intelligence as a higher-order capability that operationalizes data and AI infrastructures into coherent marketing outcomes. By synchronizing human perception with product adaptability, Situational Intelligence reorients marketing strategy from campaign-centric optimization toward self-adjusting, learning-driven engagement ecosystems capable of responding dynamically to situational variability.

Limitations and Future Research

Despite its contributions, this study has several limitations that suggest directions for future studies. First, the modest sample size and use of convenience and snowball sampling may constrain its generalizability. Future studies should test the Situational Intelligence framework across larger, more diverse, and cross-cultural samples.

Second, reliance on self-reported perceptions limits behavioral insights. Integrating clickstream data, interaction logs, or experimental simulations could offer more objective measures of situational cues and Product Flex Rhythms.

Third, the cross-sectional design restricts causal inference and overlooks the temporal dynamics inherent in the adaptive marketing systems. Longitudinal or experimental approaches would better capture how Situational Intelligence evolves and sustains engagement over time.

Finally, ethical considerations surrounding data use, emotional inference, and algorithmic transparency warrant dedicated studies. Future research should address the governance mechanisms that ensure responsible personalization while preserving consumer autonomy and trust.

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