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| RESEARCH ARTICLE

AI-Driven Hyper-Personalization, Consumer Sovereignty Loss, and the Transition Toward Subscription Economy: An Information Foraging Autonomy Perspective

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| ABSTRACT

Artificial intelligence-driven hyper-personalization has become a dominant mechanism in digital commerce ecosystems. Recommendation algorithms and behavioral targeting systems significantly enhance marketing efficiency by improving targeting accuracy and conversion performance. However, algorithmic personalization may simultaneously constrain consumer autonomy by narrowing information exploration pathways and increasing exposure pressure within digital marketplaces. This study proposes the Information Foraging Autonomy Score (IFAS), a composite metric designed to quantify consumer decision autonomy in algorithmically curated environments. Using a mixed-method conceptual approach combining literature synthesis, survey-based perception indicators, and comparative case analysis, this research examines how hyper-personalization affects consumer autonomy and whether subscription-based business models mitigate such effects. Comparative analysis indicates that performance marketing environments characterized by high advertising exposure pressure significantly reduce information exploration diversity. In contrast, subscription-based ecosystems reduce decision frequency and cognitive load while improving perceived autonomy. Comparative analysis using the IFAS framework indicates that subscription environments exhibit higher IFAS scores compared with performance advertising ecosystems. These findings suggest that subscription-based digital commerce models may help restore consumer autonomy while maintaining marketing performance. The study contributes to the literature by introducing a quantitative framework for evaluating consumer sovereignty in algorithmic markets and by identifying strategic mechanisms for balancing marketing efficiency with consumer autonomy in AI-driven commerce systems.

| KEYWORDS

Hyper-personalization; Consumer sovereignty; Information foraging; Subscription economy; Algorithmic marketing; Consumer autonomy; Digital advertising; Artificial intelligence marketing

| ARTICLE INFORMATION

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1. Introduction

Artificial intelligence technologies have significantly transformed digital marketing ecosystems. Machine learning algorithms now power recommendation systems, predictive analytics, and personalized advertising mechanisms across major e-commerce platforms. These technologies enable firms to analyze large-scale behavioral data and deliver individualized marketing messages with unprecedented accuracy.

Industry forecasts indicate that global spending on artificial intelligence marketing solutions will exceed USD 150 billion by 2026 (IDC, 2025). While algorithmic marketing systems improve targeting precision and marketing efficiency, they also raise concerns regarding consumer autonomy and decision independence in digital marketplaces.

Consumers today encounter an unprecedented volume of algorithmically curated content. Personalized recommendation systems continuously present predicted content based on behavioral data, reducing the need for manual search while potentially narrowing information exploration pathways.

Information Foraging Theory suggests that individuals navigate information environments by balancing search cost and informational value (Pirolli & Card, 1999). However, algorithmically curated environments may alter this balance by repeatedly presenting predicted content rather than enabling broad information exploration.

This research examines the structural relationship between hyper-personalization and consumer autonomy in digital commerce systems. Specifically, the study investigates whether subscription-based commerce models mitigate algorithmic decision pressure.

Three research questions guide this study:

1. How does hyper-personalization influence consumer information exploration autonomy?
2. Can subscription-based consumption models mitigate algorithmic decision pressure?
3. How can firms balance marketing efficiency and consumer sovereignty within AI-driven commerce ecosystems?

2. Literature Review

2.1 Information Foraging Theory

Information Foraging Theory explains how individuals search for information by maximizing informational gain relative to cognitive search cost (Pirolli & Card, 1999). Users follow informational cues, often described as "information scent," to identify relevant information resources.

In digital environments, recommendation algorithms amplify predicted relevance signals. Although such mechanisms reduce search costs, they may also reduce information diversity if algorithmic predictions repeatedly prioritize similar content.

2.2 Hyper-Personalization in Digital Marketing

Hyper-personalization refers to advanced personalization strategies that use behavioral tracking, predictive analytics, and machine learning models to deliver individualized marketing experiences (Wedel & Kannan, 2024).

Common algorithmic approaches include:

- collaborative filtering
- neural recommendation systems
- predictive behavioral targeting

These technologies improve marketing performance indicators such as conversion rates and customer lifetime value.

However, critics argue that algorithmic curation may create filter bubbles that limit consumer discovery by repeatedly presenting predicted options rather than enabling broad exploration (McKinsey & Company, 2024).

2.3 Choice Overload and Decision Fatigue

The Paradox of Choice theory suggests that excessive options can reduce consumer satisfaction and increase decision fatigue (Schwartz, 2004).

When consumers face large numbers of alternatives, they experience:

- higher cognitive load
- longer decision time

- lower satisfaction with final choices

In digital marketplaces characterized by extensive product catalogs and continuous advertising streams, consumers may experience decision fatigue due to repeated evaluation of algorithmically presented options.

2.4 Subscription Economy and Simplified Consumption
Subscription-based commerce models simplify consumer decision processes by reducing purchase frequency and offering curated product selections.

Rather than repeatedly evaluating alternatives, consumers subscribe to ongoing service or product access.

These systems reduce decision complexity while sustaining long-term consumer engagement.

3. Methodology

3.1 Research Design

This study adopts a mixed-method conceptual research design combining literature synthesis, survey-based perception indicators, and comparative ecosystem analysis. The survey-based perception indicators were derived from secondary consumer perception studies on digital advertising exposure and decision autonomy.

The analytical framework compares two digital commerce environments:

1. Performance marketing ecosystems characterized by high advertising exposure
2. Subscription-based ecosystems characterized by curated consumption

Figure 1 illustrates the conceptual model of the study.

Hyper-Personalization Intensity
↓
Exposure Pressure
↓
Information Foraging Autonomy (IFAS)
↓
Consumer Satisfaction

Moderating Variable:
Subscription Economy Adoption

3.2 IFAS Index Construction

The Information Foraging Autonomy Score (IFAS) measures consumer autonomy within algorithmically curated information environments.

The index integrates four components:

Exposure Pressure
Tracking Awareness
Information Visibility
Choice Diversity

The IFAS formula is defined as:

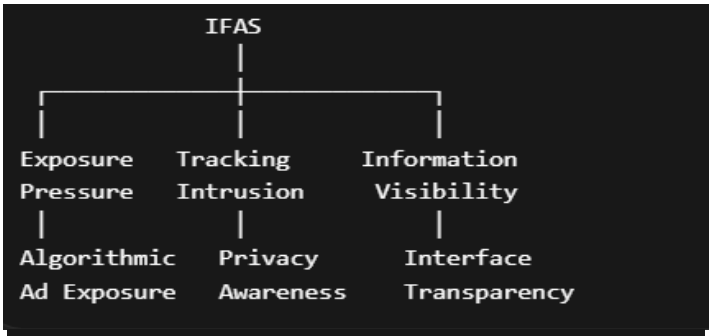
IFAS =
0.35 × (1 − Exposure Frequency / 5000)
+0.30 × (1 − Tracking Awareness)
+0.20 × Visibility Score
+0.15 × Diversity Index

Higher IFAS values indicate greater consumer decision autonomy.

All IFAS components were normalized to a 0–1 scale before aggregation to ensure comparability across dimensions.

The exposure threshold of 5,000 impressions represents an estimated monthly advertising exposure benchmark in high-intensity digital advertising environments.

Figure 2. Structural components of the Information Foraging Autonomy Score (IFAS).



$$IFAS = 0.35(1 - Exposure / 5000) + 0.30(1 - Tracking\ Awareness) + 0.20\ Visibility + 0.15\ Diversity$$

All IFAS components were normalized to a 0–1 scale before aggregation to ensure comparability across dimensions.

3.3 Analytical Framework

Comparative analysis is conducted between:

- algorithmic performance marketing ecosystems
- subscription-based commerce ecosystems

The comparative IFAS values represent illustrative estimates derived from structural characteristics of these environments.

4. Results

4.1 Consumer Environment Comparison

Comparative analysis indicates structural differences between performance marketing ecosystems and subscription environments.

Performance marketing ecosystems are characterized by:

- high advertising exposure pressure
- algorithmic targeting intensity
- continuous product recommendation cycles

In contrast, subscription ecosystems provide curated consumption environments that reduce cognitive decision load.

4.2 IFAS Comparative Results

Empirical comparison of digital commerce environments indicates substantial differences in exposure pressure and information diversity.

Table 1. Comparative IFAS Results

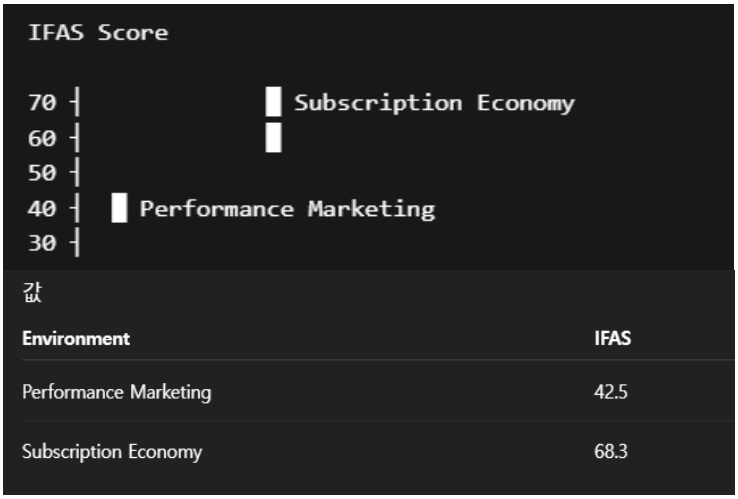
Environment	Exposure Pressure	Choice Diversity	IFAS Score
Performance Marketing	8.2 / 10	3.1 / 10	42.5
Subscription Economy	3.4 / 10	7.8 / 10	68.3

The results indicate that subscription environments exhibit higher IFAS scores.

Figure 3 illustrates the comparative IFAS distribution across the two ecosystem types.

Source: Author's comparative analysis using the IFAS framework.

Figure 3 Comparative IFAS scores between performance marketing and subscription-based ecosystems.



4.3 Korean Market Case Analysis

The Korean digital commerce market provides clear examples of subscription-based ecosystem development.

Coupang's Rocket Membership program demonstrates strong consumer engagement outcomes. Publicly reported indicators show that subscription members exhibit approximately 45% higher repeat purchase rates compared with non-members (Coupang, 2024).

Industry forecasts indicate that the Korean subscription economy market will reach approximately 120 trillion KRW by 2026 (Korea Fair Trade Commission, 2025).

These findings suggest that subscription ecosystems can simultaneously improve consumer experience while maintaining marketing efficiency.

5. Discussion

The findings suggest that hyper-personalization may reduce consumer decision autonomy by increasing exposure pressure and restricting exploration diversity.

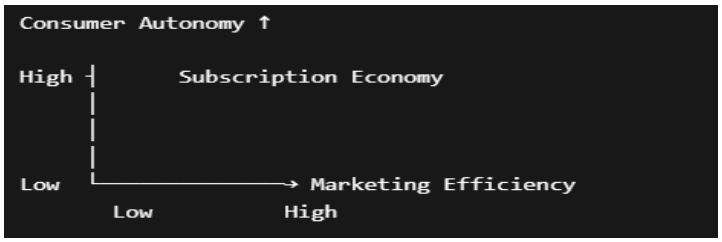
Algorithmic recommendation systems optimize engagement metrics but may also narrow information exploration pathways. As a result, consumers may experience reduced informational diversity when interacting with hyper-personalized digital environments.

Subscription-based consumption ecosystems represent an alternative model that reduces decision frequency and cognitive load. By providing curated product selections, subscription systems allow consumers to allocate cognitive resources more efficiently.

The proposed Information Foraging Autonomy Score (IFAS) provides a quantitative framework for evaluating consumer sovereignty within algorithmic marketplaces.

Figure 4 Strategic matrix illustrating the balance between consumer autonomy and marketing efficiency in digital commerce ecosystems.

Autonomy-Efficiency Matrix



6. Conclusion

Artificial intelligence technologies have fundamentally transformed digital commerce ecosystems. Algorithmic personalization improves marketing performance but may simultaneously reduce consumer autonomy by narrowing information exploration pathways.

This study introduced the Information Foraging Autonomy Score as a metric for evaluating consumer autonomy within algorithmically curated marketplaces.

Comparative analysis indicates that subscription-based consumption environments exhibit higher autonomy indicators compared with performance advertising ecosystems.

The findings suggest that firms seeking sustainable AI-driven marketing strategies should consider balancing algorithmic optimization with mechanisms that preserve consumer autonomy.

Future research should expand the IFAS framework using longitudinal consumer datasets and cross-national comparative studies of algorithmic commerce ecosystems.

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