



The Role of AI Agents in Autonomous Online Purchasing

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Abstract

The rapid development of artificial intelligence is transforming electronic commerce from a model in which consumers actively search, compare, and purchase products toward an emerging model of **agentic commerce**, in which AI agents can perform substantial portions of the purchasing process on behalf of consumers. AI agents differ from conventional recommendation systems and chatbots because they can interpret goals, plan tasks, interact with digital platforms, retrieve information, compare alternatives, and potentially execute transactions. This development has important implications for consumer behaviour, digital marketing, retail strategy, competition, transaction costs, privacy, trust, and consumer autonomy.

This paper examines the role of AI agents in autonomous online purchasing from a Commerce perspective. It discusses the evolution from traditional e-commerce and recommender systems toward conversational and agentic purchasing. The paper examines how AI agents can identify consumer requirements, search products, compare prices, evaluate reviews, monitor discounts, make recommendations, complete transactions, and provide post-purchase assistance. The analysis suggests that AI agents can substantially reduce information-search costs and decision complexity while increasing convenience and personalization. They may also benefit businesses by improving customer targeting, reducing transaction costs, increasing conversion opportunities, and creating new forms of digital customer relationships.

At the same time, autonomous purchasing introduces substantial risks. Consumers may lose direct visibility into how alternatives are selected, while AI agents may prioritize commercially sponsored products or make decisions based on incomplete or inaccurate information. Privacy concerns may intensify because agents require access to detailed consumer preferences, purchase histories, payment information, and potentially other digital services. Security risks also increase when AI agents possess the ability to perform transactions. Furthermore, autonomous purchasing raises questions regarding consumer responsibility, algorithmic accountability, competition among retailers, and the balance between convenience and consumer autonomy.

The paper concludes that AI agents are likely to become an important component of future digital commerce, but their development should be guided by principles of transparency, consumer control, security, fairness, explainability, and human oversight. Rather than completely replacing consumer decision-making, responsible AI agents should function as



delegated decision-support systems that act according to clearly defined consumer preferences and constraints. The future of autonomous online purchasing will therefore depend not only on technological capability but also on trust, governance, market structure, and the ability of consumers to maintain meaningful control over delegated purchasing decisions.

Keywords: AI Agents, Autonomous Purchasing, Agentic Commerce, E-Commerce, Artificial Intelligence, Consumer Behaviour, Online Shopping, Digital Commerce, Consumer Trust, Personalization, Algorithmic Decision-Making, Autonomous Transactions.

1. Introduction

Electronic commerce has fundamentally changed the way consumers purchase goods and services. The traditional online-shopping model requires consumers to search for products, compare alternatives, examine reviews, evaluate prices, select a seller, make payment, and monitor delivery. Although digital platforms have made these activities more convenient than traditional shopping in many circumstances, consumers still bear much of the decision-making burden.

The expansion of product variety has made this burden increasingly significant. A consumer searching for a smartphone, laptop, hotel, insurance product, household appliance, or other product may encounter hundreds or thousands of alternatives. Consumers must identify relevant characteristics, compare prices, evaluate reviews, determine product quality, and decide whether an alternative satisfies their requirements.

Artificial intelligence has gradually reduced this burden.

Search engines can rank information. Recommendation systems can suggest products. Chatbots can answer questions. Generative AI can provide personalized explanations and comparisons.

The next stage is the emergence of **AI agents** capable of performing tasks rather than merely responding to requests.

An AI agent can potentially receive a goal such as:

"Find a suitable laptop within my budget, compare the best alternatives, and purchase it if it meets my requirements."

Instead of simply displaying search results, the agent could:

1. understand the consumer's requirements;
2. search multiple platforms;
3. identify suitable products;
4. compare specifications;
5. evaluate prices;
6. examine reviews;
7. apply consumer preferences;
8. recommend an option;
9. obtain authorization;
10. complete the purchase;



11. monitor delivery.

This represents a major transformation in e-commerce.

The consumer shifts from being a **searcher and evaluator** to becoming a **principal who delegates commercial tasks to an AI agent**.

The development has significant implications for Commerce. Businesses may no longer compete only for consumers' attention. They may increasingly compete for visibility within AI-mediated purchasing environments.

The OECD's 2025 definition of e-commerce explicitly addresses AI-assisted transactions and emerging digital ordering mechanisms, reflecting the growing relevance of artificial intelligence to commercial transactions. (oecd.org)

The purpose of this paper is to examine the role of AI agents in autonomous online purchasing and evaluate their potential benefits, risks, and broader implications for consumers and digital markets.

2. Concept of AI Agents

An AI agent is an artificial intelligence system capable of perceiving information, reasoning about a goal, planning actions, using tools, and taking actions within a defined environment.

A conventional chatbot generally performs:

Input → Response

A recommendation engine generally performs:

Consumer Data → Recommendation

An AI agent can perform:

Goal → Planning → Information Retrieval → Decision → Action → Feedback

This distinction is fundamental.

An autonomous shopping agent may interact with:

- search engines;
- online marketplaces;
- retailer websites;
- price-comparison services;
- payment systems;
- logistics platforms;
- calendars;
- customer-service systems.

Its value therefore comes from the ability to coordinate multiple digital activities.

3. Evolution of Online Purchasing

The development of AI agents can be understood through several stages.

3.1 Traditional E-Commerce

Consumers manually:

Search → Compare → Select → Pay

3.2 Recommendation-Based Commerce



Platforms began recommending products based on consumer data.

Consumer → Platform → Personalized Recommendations

3.3 Conversational Commerce

Consumers interact with AI through natural language.

Consumer → AI Assistant → Product Information

3.4 Generative AI Commerce

AI can explain, compare, summarize, and personalize product information.

3.5 Agentic Commerce

AI can potentially perform actions on behalf of consumers.

Consumer Goal → AI Agent → Search → Evaluate → Purchase

The transition represents a movement from **consumer-directed interaction** toward **delegated commerce**.

4. Theoretical Framework

4.1 Technology Acceptance Model

The Technology Acceptance Model developed by Davis (1989) provides a useful framework for understanding consumer acceptance of AI agents.

Consumers may adopt autonomous purchasing agents when they perceive them as:

- useful;
- easy to operate;
- reliable;
- time-saving.

The relationship can be represented as:

Perceived Usefulness + Ease of Use → Acceptance → Continued Use

4.2 Theory of Planned Behaviour

The Theory of Planned Behaviour suggests that attitudes, subjective norms, and perceived behavioural control influence behavioural intentions.

AI agents may alter perceived behavioural control by making online purchasing easier.

However, excessive delegation may simultaneously reduce consumers' direct control over purchasing decisions.

4.3 Information-Processing Perspective

Online consumers face information overload.

AI agents can reduce cognitive effort by filtering alternatives.

Therefore:

Large Choice Set → Information Overload → AI Filtering → Reduced Decision Complexity

However, filtering also creates a risk: the consumer may never see alternatives that the AI does not select.

5. Review of Literature

5.1 AI in E-Commerce



AI has become increasingly important in:

- product recommendations;
- demand forecasting;
- customer service;
- fraud detection;
- personalized advertising;
- inventory management;
- pricing.

AI agents represent a logical extension of these applications.

5.2 Recommendation Systems

Recommendation systems have traditionally influenced what consumers see.

AI agents potentially go further by determining:

What should be searched?

Which alternatives should be compared?

Which product best satisfies the goal?

Should the transaction be completed?

This gives agents greater influence over consumer decisions.

5.3 Generative AI and Digital Commerce

Generative AI allows consumers to interact with commerce systems using natural language.

Instead of entering multiple search queries, consumers can communicate goals conversationally.

This may reduce search costs.

However, generative systems can also produce inaccurate information, making verification important.

5.4 Agentic Commerce

Agentic commerce represents a shift toward autonomous digital purchasing.

The AI becomes an intermediary between consumers and sellers.

This raises a new commercial question:

Who controls the purchasing journey—the consumer, the AI agent, or the platform through which the agent operates?

This question is central to future research.

6. Role of AI Agents in Autonomous Purchasing

AI agents may perform several stages of the purchasing process.

6.1 Need Identification

Consumers may communicate goals rather than product names.

For example:

"I need a reliable laptop for business travel."

The AI interprets the underlying requirements.



6.2 Product Search

The agent can search multiple sources.

It may examine:

- price;
- specifications;
- availability;
- delivery time;
- ratings;
- reviews.

This can reduce search effort.

6.3 Product Comparison

AI can organize information into comparable categories.

For example:

Factor	Product A	Product B	Product C
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Price	Medium	High	Low
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Battery	High	Medium	High
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Weight	Low	Medium	High
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Reviews	High	High	Medium
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The agent can then evaluate the alternatives against the consumer's preferences.

7. Personalized Decision-Making

AI agents can maintain information about consumer preferences.

Preferences may include:

- budget;
- preferred brands;
- product characteristics;
- delivery requirements;
- sustainability preferences;
- payment preferences.

This allows the agent to make decisions tailored to the consumer.

However, personalization introduces privacy concerns because the agent may require substantial amounts of personal data.

8. Autonomous Price Comparison

Price comparison is one of the most important applications.

An AI agent could compare:



- retailer prices;
- delivery fees;
- discounts;
- membership benefits;
- warranties;
- return policies.

This can improve price transparency.

However, if an AI agent relies primarily on a limited set of retailers, its comparison may not be genuinely comprehensive.

9. AI Agents and Consumer Buying Behaviour

AI agents may fundamentally alter consumer behaviour.

Traditional behaviour:

Search → Browse → Compare → Decide

Agentic behaviour:

State Goal → Review Recommendation → Approve

This could reduce:

- browsing time;
- cognitive effort;
- decision fatigue.

However, it may also reduce:

- product exploration;
- brand discovery;
- spontaneous discovery;
- independent comparison.

Consumers may increasingly trust the agent's evaluation rather than independently examining alternatives.

10. AI Agents and Consumer Trust

Trust will be essential for autonomous purchasing.

Consumers must trust that the agent:

- understands their preferences;
- searches fairly;
- provides accurate information;
- does not favour particular sellers without disclosure;
- respects spending limits;
- protects personal information.

Trust can be strengthened through:

- transparent reasoning;



- clear preferences;
 - spending controls;
 - purchase confirmations;
 - audit logs;
 - easy cancellation.
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11. Consumer Autonomy

Autonomy is one of the most important issues in agentic commerce.

Delegating a purchasing task does not necessarily mean surrendering decision-making authority.

A consumer may establish boundaries:

"Purchase automatically only when the price is below a specified amount."

This creates a controlled form of autonomy.

A responsible agent should therefore operate within consumer-defined parameters.

The ideal relationship can be expressed as:

Consumer Sets Rules → AI Executes Within Rules

rather than:

AI Makes Unrestricted Decisions

12. AI Agents and Impulse Buying

AI agents could potentially reduce impulse purchasing because they can enforce predefined rules.

For example:

"Do not purchase non-essential products automatically."

However, businesses could also design agents to promote additional products.

This raises concerns regarding commercial influence.

If an AI agent is simultaneously acting as:

- consumer assistant;
- retailer representative;
- advertising intermediary,

conflicts of interest may emerge.

13. Commercial Influence and Sponsored Recommendations

One of the major challenges in agentic commerce will be determining how recommendations are ranked.

Suppose three products satisfy a consumer's requirements.

If one retailer pays for preferential placement, the agent's recommendation may become commercially influenced.

Consumers should therefore know whether recommendations are:



- preference-based;
- price-based;
- quality-based;
- sponsored;
- commission-driven.

Transparency is essential to preserve trust.

14. Privacy and Data Protection

Autonomous purchasing requires extensive data.

An agent may need access to:

- purchasing history;
- preferences;
- addresses;
- payment methods;
- shopping behaviour;
- subscriptions;
- schedules.

This creates a high-value target for data misuse.

Businesses should adopt:

- data minimization;
- encryption;
- access controls;
- explicit permissions;
- secure authentication.

Consumers should also have the ability to revoke permissions.

15. Cybersecurity Risks

AI agents capable of transactions create new cybersecurity risks.

An attacker who compromises an agent could potentially:

- manipulate purchases;
- change preferences;
- redirect deliveries;
- access personal data;
- make unauthorized transactions.

Agentic systems therefore require stronger security than ordinary recommendation systems.

Important measures include:

Authentication

Verify the identity of the user.

Authorization



Define which actions the agent can perform.

Transaction Limits

Set spending boundaries.

Confirmation

Require approval for high-risk purchases.

Monitoring

Detect unusual behaviour.

16. AI Hallucination and Decision Errors

Generative AI can produce incorrect information.

In autonomous commerce, errors may have direct financial consequences.

For example, an AI agent might incorrectly conclude that:

- a product meets a specification;
- a return is permitted;
- a discount is available;
- delivery is guaranteed.

Therefore, AI agents should use verified and current information sources.

High-impact purchasing decisions should include confirmation mechanisms.

17. Economic Benefits

AI agents can reduce transaction costs.

Traditional online purchasing requires consumers to spend time searching and comparing.

AI agents can automate these activities.

The economic process can be represented as:

Lower Search Cost → Lower Transaction Cost → Greater Efficiency

Businesses may also benefit through:

- improved conversion;
- better customer targeting;
- reduced service costs;
- increased personalization.

18. Impact on Retailers

Agentic commerce may change the way retailers compete.

Today, retailers compete for:

- search rankings;
- advertising visibility;
- consumer attention.

In the future, retailers may increasingly compete for:

AI Agent Selection



This creates a new form of digital visibility.

Retailers may need to optimize:

- product data;
- pricing;
- availability;
- delivery reliability;
- reputation;
- structured information.

The concept of "AI discoverability" could become strategically important.

19. Impact on Small and Medium Enterprises

AI agents could create opportunities for SMEs.

A small business may be discovered by an AI agent if it offers:

- competitive prices;
- strong product quality;
- reliable delivery;
- accurate product information.

This could potentially reduce dependence on large advertising budgets.

However, large platforms may have advantages because they possess:

- greater data;
- stronger infrastructure;
- established customer relationships;
- sophisticated AI systems.

Therefore, agentic commerce could either increase or reduce competitive opportunities depending on market structure.

20. Consumer Welfare

AI agents can improve consumer welfare by reducing:

- search costs;
- information costs;
- transaction costs.

They may also increase product matching.

However, welfare may decline if:

- recommendations are biased;
- prices are manipulated;
- consumers lose autonomy;
- data are misused.

The welfare impact therefore depends on the governance of agentic systems.



21. AI Agents and Market Competition

Agentic commerce could change competitive dynamics.

If consumers rely heavily on a small number of AI agents, those agents may gain significant market power.

An AI agent could become the primary gateway through which consumers access digital markets.

This creates a potential concentration problem:

Consumer → AI Agent → Selected Retailers

rather than:

Consumer → Open Marketplace

If the agent becomes dominant, its ranking decisions could significantly affect sellers.

Competition policy may therefore need to examine AI-mediated market access.

22. Autonomous Purchasing and Consumer Responsibility

A difficult legal and commercial question is:

Who is responsible when an AI agent makes a mistake?

Potential parties include:

- consumer;
- AI developer;
- retailer;
- platform provider;
- payment provider.

Clear accountability mechanisms will become increasingly important.

Consumers should receive transaction records showing:

- what was purchased;
 - why it was purchased;
 - price;
 - seller;
 - authorization conditions.
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23. Ethical Considerations

Ethical agentic commerce should follow several principles.

Transparency

Consumers should understand how agents operate.

Fairness

Agents should not unfairly favour sellers.

Consumer Control

Consumers should define spending and decision boundaries.

Privacy



Personal data should be minimized and protected.

Accountability

Businesses should remain responsible for automated commercial systems.

Explainability

Consumers should be able to understand important purchasing recommendations.

24. Human Oversight

Complete autonomy may not be appropriate for every purchase.

A risk-based model is preferable.

Low-Risk Purchases

Routine purchases may be automated.

Medium-Risk Purchases

AI recommends; consumer approves.

High-Risk Purchases

Human decision-making should remain central.

This creates a useful framework:

Purchase Type	AI Role
Routine, low-value	Autonomous
Moderate-value	Recommendation + confirmation
High-value	Decision support
Financially sensitive	Strong human control
Legally sensitive	Human oversight

25. Future of Agentic Commerce

The future of e-commerce may involve multiple specialized AI agents.

For example:

Shopping Agent

Searches products.

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Comparison Agent

Evaluates alternatives.

↓

Price Agent

Monitors prices.

↓

Transaction Agent

Completes payment.

↓



Service Agent

Handles post-purchase support.

This could create an ecosystem of AI-mediated commerce.

Consumers may interact primarily with AI systems rather than individual retailer websites.

26. Conceptual Model

The proposed conceptual framework is:

Consumer Goal



AI Agent



Preference Interpretation



Search and Information Retrieval



Alternative Evaluation



Recommendation



Consumer Authorization



Transaction Execution



Delivery and Post-Purchase Monitoring



Feedback and Learning

The relationship is influenced by:

Trust + Privacy + Security + Transparency + Consumer Control + Algorithmic Fairness

27. Research Gaps

Several research gaps require attention.

27.1 Consumer Acceptance

More research is needed to understand why consumers trust or reject autonomous purchasing.

27.2 Consumer Autonomy

The long-term effect of delegation on decision-making remains unclear.

27.3 Agent Bias

Research should examine whether AI agents systematically favour certain sellers.

27.4 Competition

The effects of agentic commerce on platform power require further investigation.



27.5 Privacy

More evidence is needed regarding consumer willingness to share data with autonomous agents.

27.6 Security

Research should investigate new attack mechanisms targeting agentic systems.

27.7 Legal Responsibility

The allocation of responsibility for autonomous transactions requires further examination.

28. Future Research Directions

Future research may examine:

1. AI agents and purchase intention.
2. Agentic commerce and consumer trust.
3. Autonomous purchasing and decision fatigue.
4. AI agents and impulse buying.
5. Privacy concerns in autonomous commerce.
6. AI agent bias in product recommendations.
7. Agentic commerce and competition.
8. AI agents and SME competitiveness.
9. Autonomous purchasing in emerging economies.
10. Consumer willingness to delegate purchasing decisions.
11. AI agents and personalized pricing.
12. Human oversight in autonomous transactions.
13. AI agents and consumer loyalty.
14. Agentic commerce and digital payment systems.
15. Legal accountability for autonomous purchasing.

29. Recommendations

For E-Commerce Businesses

Businesses should:

1. provide accurate and structured product information;
2. disclose sponsored recommendations;
3. respect consumer-defined purchasing limits;
4. maintain strong cybersecurity;
5. provide transaction records;
6. offer easy human support;
7. monitor AI decisions;
8. avoid manipulative agent design;
9. implement authorization controls;
10. maintain clear accountability.



For AI Developers

Developers should:

- improve factual accuracy;
- provide explainability;
- implement permission systems;
- build secure agent architectures;
- maintain audit trails;
- prevent unauthorized transactions.

For Consumers

Consumers should:

- establish spending limits;
- review agent permissions;
- verify high-value purchases;
- protect authentication credentials;
- monitor transaction histories.

For Policymakers

Policymakers should:

- clarify consumer rights;
- establish AI transparency requirements;
- address algorithmic discrimination;
- protect consumer data;
- monitor competition concerns;
- establish accountability standards for autonomous transactions.

30. Conclusion

AI agents represent an important emerging stage in the evolution of electronic commerce. Traditional online purchasing requires consumers to perform extensive search, comparison, and evaluation activities. Recommendation systems and generative AI have already reduced some of this burden. AI agents take the transformation further by potentially performing complete purchasing workflows on behalf of consumers.

The central value of AI agents lies in their ability to transform consumer goals into coordinated digital actions.

Instead of:

Search → Compare → Select → Purchase

the consumer may increasingly experience:

Goal → AI Agent → Recommendation → Authorization → Purchase

This transformation can produce substantial benefits. Consumers may save time, reduce cognitive effort, compare products more efficiently, and receive highly personalized assistance.



Businesses may benefit from lower transaction costs, increased customer engagement, improved targeting, and more efficient digital operations.

However, autonomous purchasing also introduces significant risks.

An AI agent may make an incorrect decision, rely on incomplete information, favour certain retailers, expose sensitive consumer information, or perform an unauthorized transaction. More fundamentally, excessive delegation could reduce consumers' understanding and control over purchasing decisions.

The development of agentic commerce therefore requires a balance between **automation and autonomy**.

The objective should not be unrestricted AI decision-making. Instead, AI agents should operate within consumer-defined boundaries.

A responsible model can be summarized as:

Consumer Defines Goals and Limits → AI Searches and Evaluates → Consumer Maintains Appropriate Control → AI Executes Authorized Actions

This model recognizes the economic value of automation while preserving consumer agency. Agentic commerce will also have implications for competition. If consumers increasingly rely on a small number of AI agents, those systems could become important gateways to digital markets. Retailers may therefore shift from competing primarily for consumer attention to competing for AI recommendations. This could create new forms of market power and require appropriate competition oversight.

The future of online purchasing is consequently unlikely to be defined simply by "more AI." It will be defined by how effectively AI can combine convenience, accuracy, personalization, security, fairness, and consumer control.

AI agents have the potential to become the next major interface between consumers and digital markets. If designed responsibly, they can function as intelligent purchasing assistants that reduce transaction costs while improving consumer welfare. If poorly governed, they could create new forms of manipulation, concentration, privacy loss, and loss of autonomy.

The sustainable future of autonomous online purchasing therefore depends on a simple principle:

AI should act on behalf of consumers—not against their interests and not without meaningful control.

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