



Generative AI and Automated Customer Service in E-Commerce

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Abstract

Generative Artificial Intelligence (GenAI) is rapidly transforming customer service in electronic commerce by changing how businesses communicate with customers, process service requests, resolve complaints, and provide personalized assistance. Traditional e-commerce customer service has relied heavily on human agents, rule-based chatbots, frequently asked questions, and scripted responses. Generative AI introduces a more flexible model in which large language models can understand natural-language questions, generate context-sensitive responses, summarize customer interactions, retrieve information from business databases, and increasingly support or execute service-related tasks. This transformation has important implications for service quality, operational efficiency, customer satisfaction, personalization, employee productivity, and the economics of digital commerce.

The present paper examines the role of generative AI in automated customer service in e-commerce. It analyses major applications including AI chatbots, conversational commerce, automated complaint handling, order-status assistance, product support, return and refund management, sentiment analysis, agent-assistance systems, multilingual service, and emerging AI agents. The paper argues that GenAI can reduce response times, extend service availability, lower repetitive workloads, improve consistency, and enable businesses to scale customer support across large digital markets. Recent evidence is particularly relevant: an OECD survey of more than 5,000 SMEs found that customer service was one of the significant business-support uses of generative AI, with 37.3% of GenAI-using SMEs reporting use in customer service.

Nevertheless, automation creates significant risks. Generative AI can produce inaccurate or fabricated responses, mishandle sensitive information, misunderstand complex complaints, reproduce bias, and create uncertainty concerning accountability. Excessive automation may also weaken human empathy and reduce customer trust, particularly in emotionally sensitive or high-complexity situations. Recent field evidence from e-commerce after-sales operations suggests that GenAI assistance can improve service speed and some measures of customer-rated quality, while effects can differ across worker groups and task contexts.

The paper concludes that the most sustainable model is not complete replacement of human customer-service employees but **human-AI collaboration**, in which generative AI handles routine, information-intensive, and repetitive interactions while human agents manage complex, sensitive, exceptional, and high-value cases. Responsible implementation therefore



requires accuracy controls, human escalation, privacy protection, transparency, continuous monitoring, employee training, and clear accountability.

Keywords: Generative AI, E-Commerce, Automated Customer Service, Artificial Intelligence, Chatbots, Conversational Commerce, Customer Satisfaction, Service Quality, Customer Experience, Large Language Models, AI Agents, Digital Commerce.

1. Introduction

Electronic commerce has transformed the way businesses interact with customers. Consumers can now search for products, compare prices, place orders, make payments, track deliveries, request refunds, and communicate with businesses through digital channels. As e-commerce has expanded, customer service has become an increasingly important component of the overall customer experience.

Traditional customer service models have depended heavily on human agents. Although human interaction offers flexibility and empathy, it can be expensive and difficult to scale. Customer-service departments must manage fluctuations in demand, repetitive questions, multiple languages, different time zones, and increasing expectations for immediate responses.

Earlier generations of automation addressed some of these problems through rule-based chatbots and scripted systems. Such systems could respond to predefined questions but often struggled when consumers used unexpected language or presented complex problems.

Generative AI represents a major technological change because it can generate natural-language responses rather than simply retrieving predetermined answers. Large language models can interpret conversational requests, summarize information, maintain contextual dialogue, and generate responses that resemble human communication.

This has created the possibility of automated customer service that is more flexible, conversational, and personalized.

The development is occurring within a broader transformation of e-commerce. The OECD's revised 2025 definition of e-commerce specifically provides guidance concerning AI-assisted transactions and emerging digital ordering channels, reflecting the increasing integration of AI into commercial activity.

Generative AI is also becoming increasingly relevant to businesses of different sizes. OECD survey evidence indicates that SMEs are using GenAI across multiple business-support functions, with marketing and sales particularly prominent and customer service also representing a substantial application area.

The central question is therefore no longer whether AI will be used in e-commerce customer service. Rather, the question is:

How can generative AI automate customer service while preserving accuracy, trust, accountability, and the human qualities that consumers value?

This paper examines that question from a Commerce perspective.



2. Conceptual Understanding of Generative AI

Generative AI refers to artificial intelligence systems capable of generating new content based on patterns learned from large datasets.

Generated content may include:

- text;
- images;
- audio;
- video;
- summaries;
- product descriptions;
- conversational responses.

In customer service, text generation is particularly important.

A conventional automated system may operate as:

Customer Question → Identify Intent → Retrieve Scripted Answer

A generative AI system can operate as:

Customer Question → Understand Context → Retrieve Relevant Information → Generate Response → Continue Conversation

This difference provides greater flexibility.

Generative AI can also be connected to business systems. When appropriately integrated, a customer-service AI system may access:

- order databases;
- product catalogues;
- delivery information;
- return policies;
- customer profiles;
- inventory systems.

This makes it possible to move from simple conversation toward **action-oriented customer service**.

3. Evolution of Automated Customer Service

Customer-service automation has developed through several stages.

3.1 Rule-Based Systems

Early chatbots relied on predefined rules.

Their limitations included:

- limited vocabulary;
- rigid conversation structures;
- poor handling of unexpected questions.

3.2 Machine-Learning Chatbots

Machine-learning systems improved intent recognition.



They could classify questions such as:

- "Where is my order?"
- "How can I return this?"
- "Can I change my address?"

3.3 Conversational AI

Natural-language processing enabled more flexible interactions.

3.4 Generative AI

Generative AI can create context-sensitive responses and maintain longer conversations.

3.5 AI Agents

The emerging stage involves AI systems capable of using tools and completing actions.

For example:

Customer: "My order has not arrived. Can you check it?"

An advanced AI agent could:

1. identify the customer;
2. locate the order;
3. check shipment status;
4. identify the delay;
5. communicate the information;
6. initiate an appropriate service process.

The movement is therefore from:

Information Retrieval

toward:

Information + Reasoning + Action

4. Theoretical Framework

4.1 Technology Acceptance Model

The Technology Acceptance Model developed by Davis (1989) suggests that perceived usefulness and perceived ease of use influence technology acceptance.

In AI customer service, consumers may accept automated support when they perceive that it:

- saves time;
- provides accurate information;
- is easy to use;
- solves problems efficiently.

4.2 Service Quality Perspective

Traditional service quality emphasizes dimensions such as:

- reliability;
- responsiveness;
- assurance;



- empathy;
- tangibles.

Generative AI can strongly influence responsiveness and consistency.

However, empathy remains more difficult to reproduce convincingly.

Therefore, AI may be strongest in routine information-intensive service while humans remain important for emotionally complex cases.

4.3 Stimulus-Organism-Response Perspective

The interaction can be understood as:

AI Service Features



Consumer Perception



Trust / Satisfaction / Perceived Convenience



Behavioural Response



Retention / Purchase / Recommendation

The quality of AI interaction therefore influences downstream commercial outcomes.

5. Review of Literature

5.1 Artificial Intelligence and Customer Service

AI has increasingly been integrated into customer-service activities because customer support generates large quantities of structured and unstructured information.

AI can analyse:

- customer messages;
- reviews;
- complaints;
- interaction histories;
- sentiment;
- service outcomes.

This allows businesses to automate routine processes and identify patterns in customer problems.

5.2 Generative AI and Customer Interaction

Generative AI differs from traditional automation because it can generate responses dynamically.

This makes interactions more conversational.



Research examining consumers' responses to text-based e-commerce chatbots found that perceptions such as friendliness and empathy can influence trust, while task complexity and disclosure of chatbot identity can affect these relationships.

This suggests that simply making an AI system conversational does not guarantee positive customer reactions. The design of the interaction matters.

5.3 Generative AI and Employee Assistance

Generative AI does not necessarily have to communicate directly with customers.

It can also assist human agents by:

- drafting responses;
- summarizing customer history;
- suggesting solutions;
- retrieving relevant policies;
- translating messages.

Recent field research involving e-commerce after-sales customer service found that access to a generative AI assistant improved service speed and some subjective measures of service quality, although effects differed between worker groups.

This supports the argument for human-AI collaboration rather than universal replacement.

6. Major Applications of Generative AI in E-Commerce Customer Service

6.1 AI Chatbots

AI chatbots can provide 24-hour assistance.

Common questions include:

- Where is my order?
- What is the return policy?
- Is the product available?
- How can I change my address?
- When will delivery occur?

Automating these questions can significantly reduce the workload of human agents.

6.2 Order Tracking

One of the most suitable applications is order tracking.

The AI can connect with logistics systems and provide current information.

A simple question such as:

"Where is my package?"

can be answered without requiring a human employee to manually inspect the order.

6.3 Return and Refund Assistance

AI can guide customers through return processes.

It can:

1. identify the order;



2. explain eligibility;
3. collect necessary information;
4. initiate the return;
5. communicate expected timelines.

However, exceptions should be escalated to human employees.

6.4 Product Support

Customers frequently need assistance understanding products.

Generative AI can explain:

- product features;
- specifications;
- compatibility;
- usage instructions.

The major requirement is that the underlying product information must be accurate.

6.5 Complaint Handling

AI can identify the nature of complaints and recommend appropriate responses.

However, emotionally sensitive complaints require careful handling.

A consumer who has experienced financial loss, repeated delivery failures, or serious dissatisfaction may prefer human assistance.

6.6 Personalized Customer Service

Generative AI can use customer history to personalize responses.

For example, it may recognize that a consumer has previously purchased a particular product and provide relevant support.

Personalization can improve convenience but also raises privacy concerns.

6.7 Multilingual Customer Service

Generative AI can translate and generate responses in multiple languages.

This can help e-commerce businesses serve international customers without requiring large multilingual teams.

For global e-commerce, multilingual AI can therefore reduce communication barriers.

6.8 Sentiment Analysis

AI can analyse language to identify potential:

- frustration;
- anger;
- satisfaction;
- urgency.

A customer expressing strong dissatisfaction can be automatically escalated.

This creates a useful division:

Conclusion

Generative AI is transforming customer service in e-commerce from a largely human-operated support function into an increasingly intelligent, automated, and conversational system. Its



capabilities extend beyond traditional chatbots because generative AI can understand natural-language requests, produce contextual responses, summarize information, personalize interactions, and potentially perform actions through connections to business systems.

The commercial benefits are substantial. Businesses can reduce repetitive workloads, provide 24-hour assistance, improve response times, support multilingual customers, scale service operations, and potentially improve customer experience. Consumers can benefit from faster responses, easier access to information, personalized assistance, and more convenient problem resolution.

The development of GenAI also has important economic implications. Customer service has traditionally been labour-intensive. Automation can reduce the marginal cost of handling routine interactions and allow human employees to focus on complex activities. Recent field evidence from e-commerce after-sales service indicates that generative AI assistance can improve service speed and some customer-rated service outcomes, while also demonstrating that its effects can vary according to worker characteristics and how the technology is used.

However, automation should not be equated with complete replacement of human customer service.

Generative AI can produce inaccurate information, misinterpret customer intent, mishandle complex complaints, and create privacy and security risks. In emotionally sensitive interactions, customers may value human empathy and judgment more than immediate automated responses.

The most appropriate model is therefore likely to be **human-AI collaboration**.

Under this model, AI manages routine and information-intensive activities, while human employees handle complex, sensitive, exceptional, and high-value interactions.

The future may move further toward agentic customer service, where AI systems not only answer questions but also perform actions such as checking orders, initiating returns, arranging replacements, and processing routine service requests. This could dramatically increase efficiency, but it also increases the consequences of AI errors.

Consequently, businesses must develop strong governance systems. AI should operate with verified information, appropriate authorization controls, privacy safeguards, monitoring, and clear escalation pathways.

The central objective should not be to automate the maximum possible number of customer interactions. Instead, businesses should seek to automate the **right** interactions while preserving human involvement where human judgment and empathy create genuine value.

Generative AI can make e-commerce customer service faster, more scalable, and more personalized. Its long-term commercial success, however, will depend on whether customers perceive these benefits as improvements rather than replacements for meaningful service.

The future of e-commerce customer service should therefore be understood not as:

Human Service → AI Replacement

but as:



Human Expertise + Generative AI → Intelligent Customer Service

This model offers the greatest potential for combining technological efficiency with consumer trust, service quality, and sustainable competitive advantage.

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