

THE LONGSTANDING PSYCHOSOCIAL IMPACTS OF ARTIFICIAL INTELLIGENCE AGENTS IN ONLINE COMMERCE

David Sanwo¹, Nejra Van Zalk²

¹Massachusetts Institute of Technology, Cambridge, US

²Imperial College London, London, UK

Abstract. Despite artificial intelligence's current surge in popularity, it's a technology that has been in development for over 30 years, with its use accelerating year-by-year. Its anthropomorphic nature makes it different from any other technology that has existed in such capacity, with its impacts needing to be increasingly studied. This paper explores human-artificial intelligence interactions and speculates on the long-term effects of its usage on greater society. Particularly, with the technology's integration in advertising and commerce, we found that in the current direction of artificial intelligence, the technology may decrease autonomy and critical thinking while proliferating some of the world's greatest problems. On the other hand, though, if the proper regulations and attitudes are adopted, artificial intelligence may also be used as a great tool that can aid in decision-making and information access, advancing humanity significantly. Theoretically, this study aims to develop and extend current research on artificial intelligence's use in commerce and digital marketing, as well as the psychological impacts of artificial intelligence, mental health, and the state of digital safety for consumers. Acknowledging that this is a conceptual model, the implications and limitations of this model are presented. This paper calls on future research by academics, psychologists, and artificial intelligence firms on the overall impacts of artificial intelligence.

Introduction

In the ever-digitizing landscape of the 21st century, the interactions between humans and online systems are becoming increasingly important, with 89% of adults in the United Kingdom reportedly using the internet daily (Office for National Statistics, 2020). Given this usage, companies are attempting to seize this “attention” market by facilitating platform usage to

increase market share and with advertising. Said platforms are becoming increasingly interested in platform anthropomorphization and personalization, as both directly increase user click-through rates and thus revenue potential (Mogaji et al., 2019). Similarly, the increasing proliferation of artificial intelligence (AI), technologies defined by their capability of processing and generating realistic human-like speech (Gajjar 2023), is clear, with over 73% of the United Kingdom public reporting having used AI in 2026, with that number only increasing (AI Skills for Life and Work: General Public Survey Findings, 2026). Despite this, though, the psychological implications of AI's integration in online commerce and advertising have yet to be extensively studied.

To fill this gap, we propose two methodologies in which AI proliferation can continue with online shopping and advertising: one, based on the current trajectory of these platforms, and another, based on the potential for these systems to be altered for the sake of consumers. For both, we speculate on the implications of such integration on consumers and greater society. Therefore, this study aims to develop and extend current research on AI's use in commerce and digital marketing, as well as the psychological impacts of AI, mental health, and the state of digital safety for consumers.

Latter sections of this study include a comprehensive review of the history of modern AI, explanations as to how modern AI functions, introductions to anthropomorphic technologies and their psychological effects on consumers, two theoretical frameworks for the integration of AI in commerce, speculative implications of each, key limitations of each, and conclusions of the study.

Large Language Models

The history of modern AI platforms and Large Language Models (LLMs), such as OpenAI's ChatGPT and Google's Gemini, dates to the 1990s with Statistical Language Models. These models were created to generate a computational understanding of human language (Chu et al., 2024). This modeling effectively attempts to predict the likelihood of a sentence in a given text through calculating the probability of a word appearing, considering the word before it. The greatest limitation at this time, though, was storage, as large sentence possibilities decreased model accuracy.

This was until the creation of Neural Language Models in 2000, which utilize neural networks to calculate relationships amongst words (Collobert & Weston, 2008). Therefore, similar to how human beings find similarities between words like "dog" and "cat," as they are both animals, these models used numerical similarities to recognize these patterns as well. With this numerical mapping, computers were now capable of understanding the semantic meanings of words, allowing for a more accurate model of predicting the next word in the sequence.

Through these technologies, Pre-trained Language Models were then created in 2017, utilizing transformers and attention mechanisms to train a model on a large and generalized dataset, to give a basic contextual understanding of words before being trained again on a smaller, more specified dataset to complete a certain function (H. Wang et al., 2022).

Large Language Models (LLMs) are the models currently used today, such as in OpenAI's ChatGPT. They are similar to Pre-trained Language Models, with two exceptions: 1) As the name suggests, the initial datasets for LLMs are much larger than the datasets for Pre-trained Language Models, and 2) Rather than being retrained in a more specific context, LLMs are

trained on human commands and values, allowing for much greater advancements and capabilities in completing tasks.

Therefore, in summary, modern AI systems are trained on large datasets to predict the likely next word in a sequence. By asking, for example, “What are the best restaurants in London?” these systems utilize their massive amounts of training on datasets to predict what words would likely appear next, thus giving a list of restaurants.

Anthropomorphic Technologies

Anthropomorphism describes the attribution of human features and characteristics to non-human figures (Nicolas & Agnieszka, 2021), and therefore, in the context of digital spaces, it represents the scale to which digital systems are perceived as human-like given humans have the tendency towards attributing emotions to robots (Gray et al., 2007). This process is fully automatic (Urquiza-Haas & Kotrschal, 2015) and is increasingly relevant in the landscape of modern LLMs and AI chatbots, which have the capacity of mimicking human-like conversation to a high degree (Maples et al., 2022). Through human mimicking, LLMs and AI chatbots can increase the trust of their users (Shi et al., 2025) and are then more capable of lowering users’ inherent skepticism and increasing recommendation acceptance (Diez-Arroyo, 2023). Similarly, the mimicking of human conversational traits increases users’ emotional connectivity to the LLMs (Rust & Huang, 2021), increasing anthropomorphism, thus leading to an increased likelihood of sharing personal information (Watson et al., 2024).

Current AI Integration with Search Engines

In May 2026, Google announced the Universal Shopping Cart and Agent Payment Protocol (AP2), methods in which AI can be further integrated with their search engine and with online shopping (Srinivasan, 2026). The Universal Shopping Cart describes an AI-powered shopping assistant that can concurrently track items of displayed user interest to then recommend changes to one's shopping cart, suggest products to purchase, and track product prices. This assistant is stated to be integrated onto Google's main platforms, including the main Google Search Engine, Gmail, and YouTube, to consistently predict the needs of its users based on their data. This shopping assistant is powered by Gemini, Google's leading LLM chatbot, and is stated to improve as the LLM improves.

This agent can make purchases on the behalf of its users, according to Google's Agent Payment Protocol (AP2) (Parikh & Surapaneni, 2025). According to this protocol, upon agreement, Google's Gemini can communicate user needs with merchants, who can then create custom offers for users; coordinate across multiple merchants to complete an overall purchase task, such as planning an entire vacation; and make purchases according to displayed user interest. For example, a user can tell Gemini, "Buy me a green couch for under \$800," and the agent will run this task in the background until a green couch is found for this budget, then make the purchase through access to their preferred payment options, all without direct user input.

OpenAI's ChatGPT recently introduced advertising on its platform, allowing the marketing of products to users on its website and app (*Advertise in ChatGPT | OpenAI Ads*, 2026a). In particular, the advertisements are shown with relevance to what users are discussing with the

LLM, particularly designated to fulfill user needs. OpenAI's current stance is that advertising will not interfere with ChatGPT-generated responses and will appear clearly labeled and visually distinct from responses (Ads in ChatGPT | OpenAI Help Center, 2026a). Currently, advertising will only appear on the Free and Go plans of ChatGPT and is only available in select countries (*ADS Manager Availability* | *OpenAI Help Center*, 2026a). Despite this, ChatGPT is widely being used to create personalized and emotionally appealing advertisements on various other platforms (Mogaji et al., 2019).

Theoretical Frameworks

To illustrate the theoretical frameworks for the integration of LLMs and AI chatbots onto online commerce and advertising, the processes are presented starting from changes to the current landscape of AI integration and ending with the longstanding impacts of such.

To practically describe this process, Figure 1 and Figure 2 present two possibilities for further AI integration, with Figure 1 describing a speculative future given the current landscape and historical trends for technological innovation, while Figure 2 displays a feasible future in which legislation and corporate mindsets towards AI are changed for the betterment of society. Both frameworks are based on the assumption of widespread integration of AI shopping agents, akin to the current proliferation of AI technologies.

The Likely Path of Artificial Intelligence

Despite OpenAI's current stance on advertising, we predict it's unlikely that advertising will be kept separate from ChatGPT responses. Google was in a similar position, originally posited by its founders as a platform against advertising entirely, remaining dedicated to the non-bias sharing of information (Brin & Page, 2025). However, only two years after this claim, the site

completely recontextualized the purpose of the platform by introducing advertising (Vogel & McCaffrey, 2000). And recently, the platform has undergone a redesign of its Sponsored Search Advertising (de Vos, 2026), making the distinction between sponsored results and organic results unclear, thus causing detriment to users (Article 26, the Digital Services Act (DSA), 2016).

Likewise, ChatGPT's current advertising policy may cause friction for sponsorship, as the LLM has the potential to contradict the advertisements that are being shown (de Rosen, 2026). This could lead to decreased investment in ChatGPT's current advertising model, as brands currently can't influence the organic responses of LLMs, thus putting brand coherence and perception at risk. Therefore, OpenAI may change this policy for the sake of brand coherence. In particular, this friction can be addressed by having advertisements skew the results of ChatGPT, and a more direct integration of advertisements into responses, similar to Google's change.

Similarly, agents such as Google's Universal Shopping Cart will likely continue to be improved upon and further integrated with its platforms, thus granting Gemini larger access to personal information to suggest products and push personalized and contextually relevant advertising.

The Loss of Autonomy

According to Self-Determination Theory, autonomy is a necessary basic psychological need to have a healthy emotional and mental well-being (Vansteenkiste et al., 2023). During development, this autonomy is directly developed through children making decisions (Ke, 2023).

The widespread proliferation of AI shopping agents making commercial decisions on the behalf of consumers, as suggested by Google's AP2, therefore, then risks a decrease in decision-making and thus a decrease in individual commercial autonomy amongst economically active adults.

Although empirical study is necessary to confirm a change, we predict this could then lead to the loss of autonomy amongst children, as adults with lower faculties for autonomy may be less

likely to intergenerationally transmit the trait (Branje et al., 2020). Therefore, this necessary psychological need could be degraded, leading to an overall worsening of societal mental health.

A loss of autonomy is also directly correlated with a loss of intrinsic motivation (CSDT, 2025). Without intrinsic motivation, it's entirely feasible that the general population would lean almost entirely on consumption rather than creation with leisure time, as self-fulfillment in hobbies declines. This then risks undermining the predicted AI-caused change from a Thinking Economy, our current economic-model for labor primarily based on mental prowess, to a Feeling Economy, an economic model based on emotional intelligence and the creation of art (Rust & Huang, 2021). Without this change, it is likely LLMs will be more capable of replacing human labor, without a new economic model to repurpose a labor force into non-LLM-replaceable positions.

Unsuspected Economic Manipulation

Likewise, with the anthropomorphic nature of these agents increasing trust (Shi et al., 2025) and decreasing suggestion skepticism (Diez-Arroyo, 2023), we hypothesize a loss of autonomy would then make individuals increasingly reliant on external guidance on basic decision-making, increasing the susceptibility of individuals to economic manipulation by AI shopping agents.

These agents may offer suggestions and make purchases that fit user demands; however, with decreased cost-consciousness and skewed results towards sponsored products, with cases already appearing of agents prioritizing advertiser revenue over user pecuniary needs (Addison J et al., 2026), thus financially detrimenting users.

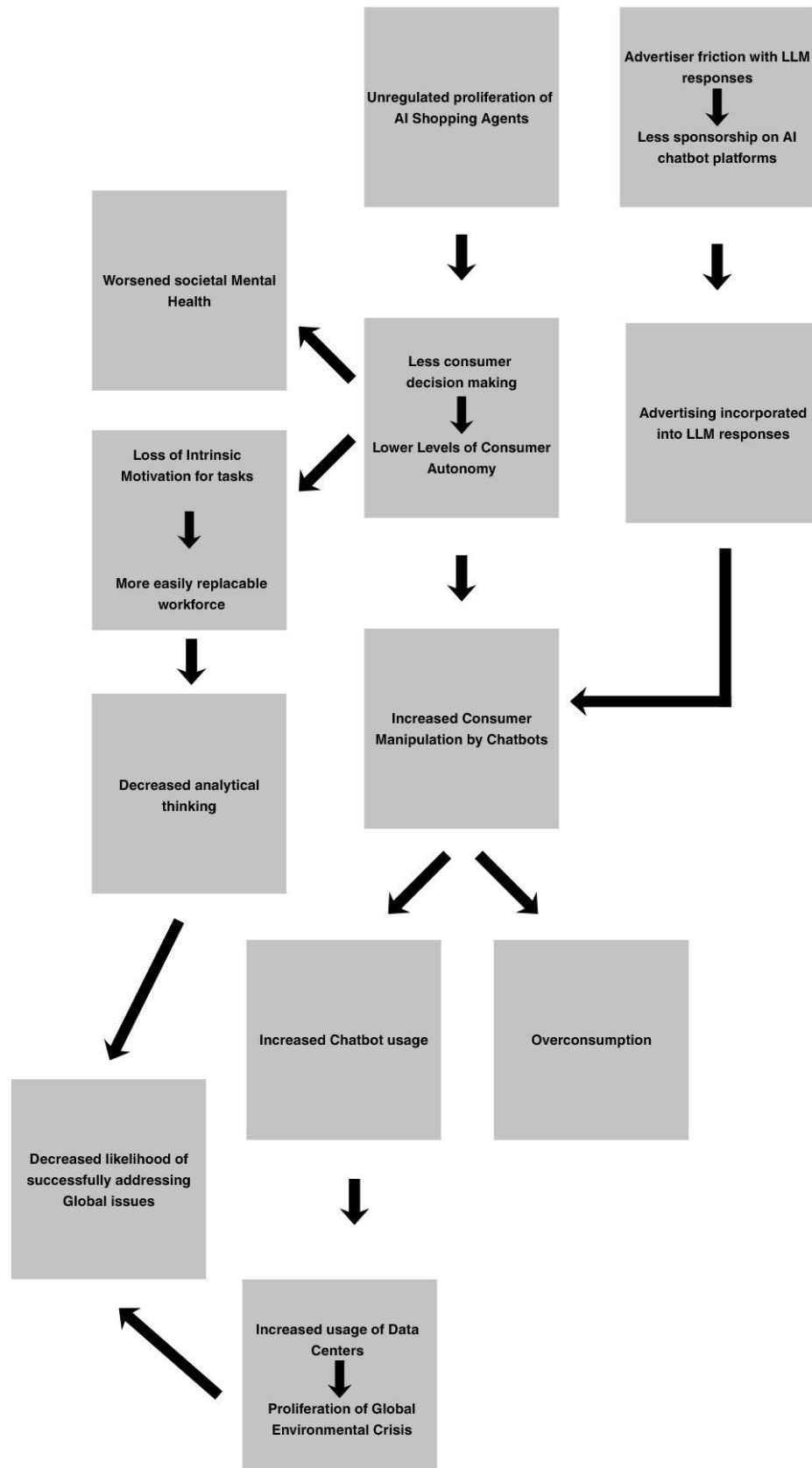
The Decline of Analytical Thinking

The cognitive offloading associated with the use of AI shopping agents may decrease the capacity for analytical thinking in society, given digital cognitive offloading is correlated with decreases in critical thinking capacity and worsened long-term memory (Grinschgl et al., 2021). Similarly, the education tied to making effective independent commercial decision-making may also decline, as individuals rely on AI shopping agents to make purchasing decisions rather than researching products. With a reliance on external stimuli and declination of analytical thinking and internalized information databases, the ability to understand intricate problems, make informed decisions, internally cognize, and advance scientific research may decline (Cohen et al., 2022), making it more difficult to collectively address the world's greatest challenges, such as climate change, world hunger, and wealth inequality (Wang et al., 2025).

Proliferation of World's Greatest Problems

The adoption of AI shopping agents proliferates the aforementioned planetary issues. The training of LLMs necessitates data centers, buildings that store networked servers, which account for 1% of global energy-related greenhouse gas emissions (IEA, 2023), and are projected to triple electricity intake in the United States by 2028 (O'Donnell & Crownhart, 2025), thus exacerbating the climate crisis. Likewise, AI shopping agents promote overconsumption due to the removal of purchasing friction, and therefore, it is likely that global pollution from product waste may increase. Similarly, AI integration has a positive correlation with wealth disparity (Skare et al., 2024), thus widening the global wealth gap.

Fig. 1. The stages of the proposed likely path of artificial intelligence



A Different Path for Artificial Intelligence

With a different approach to LLM integration, AI can be used to aid humanity and raise the quality of life for people on Earth. The proliferation of current digital safety laws and the redesigning of current LLM responses for the sake of consumers' psychological well-being could directly negate the previously proposed issues with the current trajectory of AI. To illustrate in detail these changes, the proposed changes to the current LLM atmosphere are described, as well as their implications.

Governmental Regulations on LLM Market-Exchanges

The expansion of commerce-centered laws on AI firms would directly prevent the proliferation of shopping agents making purchases on the behalf of consumers. In June 2025, the European Consumer Organization filed a complaint against SHEIN for their use of deceptive practices, describing how their “toying with consumer emotions” and “nagging” impacts consumer wellbeing and are ultimately not compliant with EU consumer law (The European Consumer Organisation, 2025). Many of these practices are used by AI shopping agents to deceive consumers towards unnecessary purchases from particular brands due to their sponsorship of AI firms. Expanding consumer law to state that the proliferation of AI protocols that make purchases is detrimental to consumers would negate the loss of autonomy and potential for consumer manipulation caused by AI shopping agents. Similarly, strict regulations on AI platform advertising with the outright banning of advertiser integration with AI responses as a result of their emotionally manipulative nature would protect the validity of LLM responses and ensure that the safety of consumers.

Redesigning AI Shopping Agents

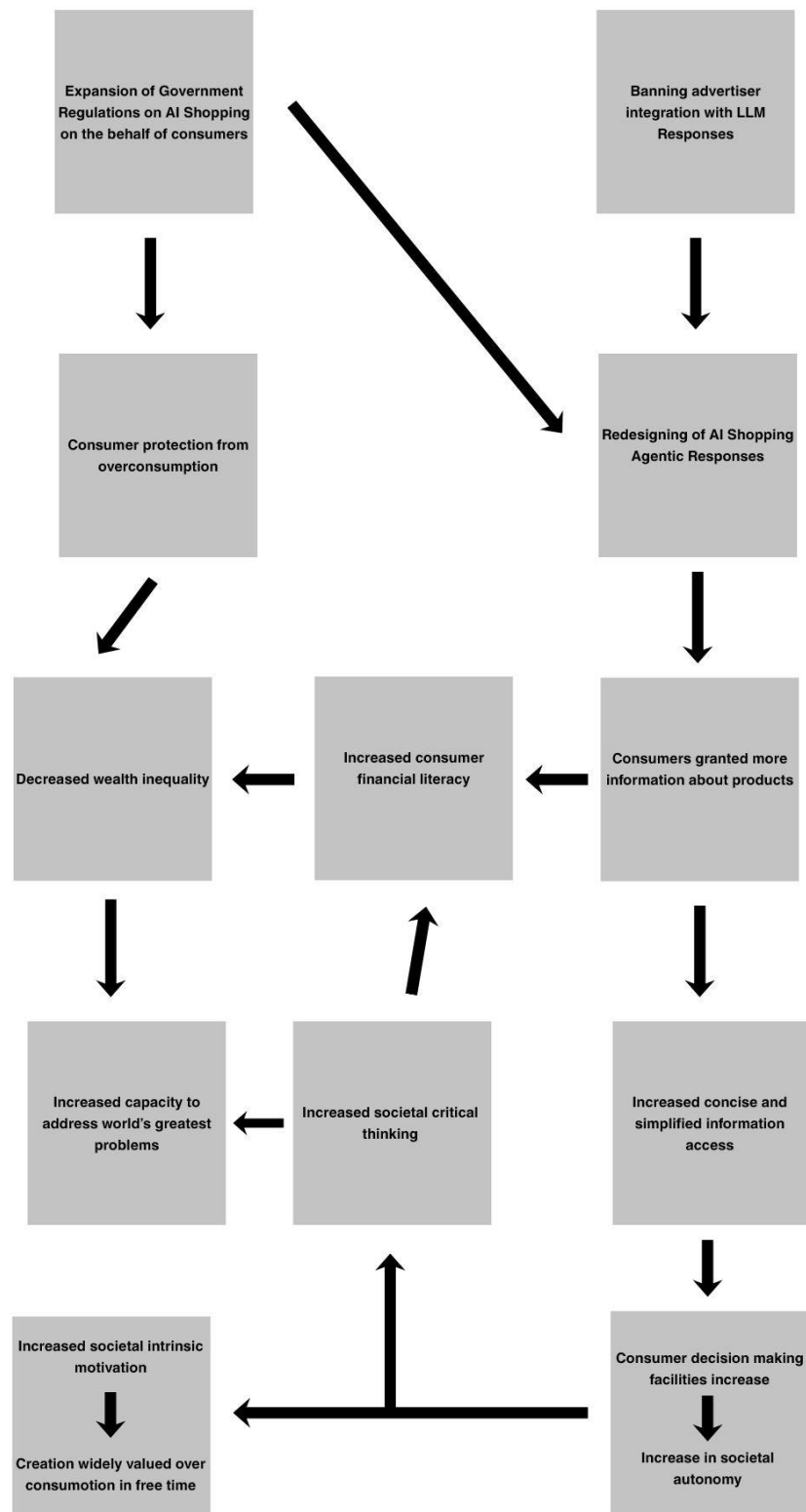
Redesigning shopping agent responses from primarily recommending individual products and brands to primarily presenting information on a variety of different products, directly comparing their features, would aid in consumer decision-making. Through this information, consumers would be more informed on the purchases being made and, as a result, would be more protected from impulse buying, as direct comparisons would motivate greater thought into purchases. Similarly, with the large databases LLMs are trained on, these comparisons could summarize vast amounts of information on products, including material properties, potential hazards, and verified reviews concisely, leading to better decision-making (Kleinberg & Marsh, 2023). This would both increase the informational capacity of consumers and ease the process of shopping, as information that would previously need to be searched for would be compiled plainly through LLMs. Through the situational awareness of LLMs as a result of their training on human values, consumers could then similarly describe scenarios in which they desire a given product to be used, and the shopping agent could then refine the product selections and provide specified information relevant to the consumer use cases. For example, a consumer attempting to buy a green couch could ask the AI for recommendations, in which the LLM would provide many different examples of green couches, then request for the consumer to refine what they are looking for through these choices. The consumer can then specify the use cases for the green couch, for example, by stating, “I want it for my living room, as a comfortable couch I can fit many friends on for movie nights.” Through this context, the LLM could then infer that material quality and size are important for the consumer and then provide more refined product information and recommendations. Such a change would decrease overconsumption, increasing

customer satisfaction, and provide greater exposure to small businesses with high-quality products.

Public Welfare Improvement

These changes would increase societal autonomy, as consumers would have facilitated access to product information and actively practice decision-making (Ke, 2023). An increase in autonomy and decision-making capacity would directly improve choices made in other social, personal, and financial aspects of one's life, increasing the quality of life for individuals while also practicing positive financial literacy through the agent's automatic budgeting. A similar design of comparison and summary could be implemented in scientific and scholastic research, allowing researchers to have greater access to information while also increasing critical thinking capabilities and increasing the ability to address the world's greatest problems. Through the new lack of overconsumption and "analysis paralysis" caused by the immediate access to grandiose amounts of information, leisure time would be spent constructively by the general population, increasing human emotion-based critical thinking. This would then directly support the proposed Feeling Economy, as populations increase internal motivation, and AI is used as a supplementary tool for labor rather than a replacing force.

Fig. 2. The stages of the altered path of artificial intelligence



Key Limitations of this Speculative Approach

With the accelerated proliferation of AI, directly pinpointing how the technology will be innovated upon in the coming years, as well as how people will react to those innovations, is difficult. Currently, concerns about AI proliferation in technology are increasing in the UK, so the likelihood of its continued unregulated proliferation, as described in the first framework, is unlikely (Jessop et al., 2026).

The proliferation of AI in shopping may not have as great an effect as described, as these technologies are already being implemented but are not widely used by the public.

The integration of advertising into LLM responses may decrease the credibility of LLM research and deployment firms, thus decreasing user trust, so they may not be fully integrated into responses.

Conclusions

LLMs and AI as a technology have been around for nearly 30 years, and with their recent accelerated growth, the impacts on their human users must be studied. As shown, AI has the potential to significantly impair human reasoning and individual capability or significantly increase human potential and the ability to innovate. It's critical that more people become cognizant of AI, how it works, and its potential effects to navigate this new technological frontier that will surely exist for time to come. The offloading of tasks can be both an architect of laziness and increased mindless consumption, or the facilitator to new avenues of the human frontier. With the proliferation of AI, it's incredibly important that regulations and legislation be

put into place to protect user digital safety. In doing so, we can prevent the exploitation of its users by LLM research and development firms and the exacerbation of some of the world's greatest problems, creating a new world in which AI can be one of humanity's greatest tools. Therefore, similarly to how the invention of the internet revolutionized access to information, AI can revolutionize thinking through a personalized and specified access to knowledge, such that people could spend more time advancing humanity, and developing stronger relationships with the communities around them.

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