

# Emerging Technologies in Marketing

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## ABSTRACT

Companies are making big inversions in technology to have more efficient marketing. The past few years have reshaped what marketing teams expect from their technology.

Emerging marketing technologies are impacting marketing professionals in a profound way, with each technology offering distinct advantages and challenges. The marketing technology landscape is evolving at an unprecedented pace and is more crowded than ever, with thousands of solutions vying for attention. Yet, only a select few are truly transformative. This paper dives deep into the most impactful emerging marketing technologies. It offers practical implementation tips for marketers to leverage these powerful marketing technologies.

**KEYWORDS:** *technology, emerging technologies, marketing, marketing leaders.*

## INTRODUCTION

The marketing landscape is undergoing a major transformation, driven by cutting-edge technologies that enhance personalization, engagement, and customer experience. Each emerging technology presents an opportunity for growth, offering us the chance to revolutionize our operations, increase revenue, and expand our horizons. These emerging technologies are reshaping the landscape of marketing and design and adapting then is crucial for staying competitive. As these technologies impact how marketers reach customers and how designers create and implement marketing materials, businesses must adapt to future-proof marketing strategies to grab market share [1].

Marketing never stands still. New marketing technology tends to impact the way managers strategize, execute, and monitor campaigns. Just when businesses feel comfortable with today's tools, new technologies shift the landscape, opening the door to fresh opportunities and challenges. Marketing leaders are beginning to see that speed alone is not a competitive advantage. In the fast-evolving world of digital marketing, staying ahead means keeping a close eye on emerging marketing technologies.

Marketing professionals must not only understand these technologies but also integrate them into their strategies to maintain a competitive edge [2]. As digital marketers, staying ahead of these trends is essential to create impactful strategies that drive engagement and results.

## WHAT ARE EMERGING TECHNOLOGIES?

Technology may be regarded as a collection of systems designed to perform some function. It can help alleviate some of the challenges facing business today. Emerging technology is a term generally used to describe new technology. The term often refers to technologies currently developing or expected to be available within the next five to ten years. Any imminent, but not fully realized, technological innovations will have some impact on the status quo.

Emerging technologies are shaping our societies. They continue to affect the way we live, work, and interact with one another. Emerging technology (ET) lacks a consensus on what classifies them as "emergent." It is a relative term because one may see a technology as emerging and others may not see it the same way. It is a term that is often used to describe a new technology. A technology is still

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emerging if it is not yet a “must-have” [3]. An emerging technology is the one that holds the promise of creating a new economic engine and is trans-industrial. ET is used in different areas such as media, healthcare, business, science, education, or defense.

The characteristics of emerging technologies include the following [4]:

- *Novelty*: Emerging technologies are typically new or novel, meaning they have yet to be widely adopted or used. They often represent a significant departure from existing technologies or processes.
- *Potential for Disruption*: Emerging technologies have the potential to disrupt existing markets, industries, or ways of doing things. They may also displace existing businesses or industries.
- *Uncertainty*: Because emerging technologies are still in the early stages of development, there is often a high uncertainty surrounding their future potential and impact. It can be challenging to predict how they will evolve.
- *Rapid Change*: Emerging technologies often evolve rapidly, with new developments and innovations emerging frequently. It can make keeping up with the latest trends and advancements challenging.
- *Interdisciplinary*: Emerging technologies often involve multiple disciplines or fields of study, such as computer science, engineering, and biology. They may require collaboration across different fields and industries to develop their potential fully.

Emerging technologies are worth investigating. They are responsible for developing new products or devices. As emerging technologies continue to evolve, engineering is poised for a transformative future. Emerging technologies have driven innovation and progress in today's rapidly evolving digital landscape. The collective impact of emerging technologies such as artificial intelligence, machine learning, big data, and the Internet of things is undeniably transformative. Some emerging technologies are shown in Figure 1 [5].

## EMERGING TECHNOLOGIES IN MARKETING

Technologies are at the core of data-driven marketing as they provide tools and techniques to collect, process, and analyze vast amounts of data about a company's customers, operations, and potential markets. Emerging marketing technologies focus heavily on AI for hyper-personalization, automation, predictive analytics, intelligent chatbots, and

blockchain for transparency, alongside advancements in AR/VR for immersive experiences. Key emerging technologies in marketing include the following [6]:

1. *Artificial Intelligence*: AI has been around for decades, but its applications in marketing have grown exponentially in recent years. AI presents marketers with a variety of opportunities to personalize customer experiences and to build their technological skills. As AI continues to evolve, its impact on marketing will become even more profound. Marketing professionals utilize AI to personalize marketing messages, optimize ad campaigns for better reach, and deliver automated recommendations based on customer behavior. They use artificial intelligence to zero in on what consumers most want to see, hear, read, and purchase. From chatbots to social media management to full-scale marketing campaigns and automation, artificial intelligence is changing the way marketers do their jobs. From predictive insights to immersive experiences, AI is redefining how marketers handle repetitive tasks, make decisions, and connect with customers. Since the inception of ChatGPT in 2022, the use of AI has taken center stage in conversations about its use in everything from healthcare to security.
2. *Robotic Process Automation (RPA)*: RPA technology has been around for decades, but its applications in marketing are becoming increasingly recognized. As repetitive tasks become automated, marketing teams can focus on strategic initiatives. RPA automates repetitive tasks, such as data entry, social media scheduling, or generating basic reports. This frees up marketing teams to focus on strategic initiatives like campaign development, creative content generation, and building stronger customer relationships.
3. *Chatbots*: Today, advancements in AI have propelled the emergence of conversational chatbots that can hold natural, engaging dialogues with customers. Conversational chatbots can answer customer queries 24/7, provide product recommendations, and even schedule appointments. Marketers utilize chatbots to handle frequently asked questions, collect customer feedback, and qualify leads. Advanced chatbots and assistants can handle customer queries, recommend products, and complete transactions in real time. By identifying products in images, virtual assistants can personalize shopping experiences by informing customers about similar items they might like. ChatGPT

builds chatbots for ecommerce sites and social media platforms, generates leads and personalized email campaigns based on consumer behavior and interests, creates social media campaigns, assists customers through purchasing processes, helps to brainstorm ideas, formulate strategies, and produce content. Remember, chatbots should complement human interaction, not replace it.

4. *Internet of Things (IoT)*: The rise of affordable sensors and Internet connectivity has fueled the growth of IoT. The ever-expanding network of connected devices generates a treasure trove of customer data. Imagine smartwatches tracking fitness data that can be used for targeted fitness product promotions. The Internet of things (IoT) represents a remarkable technological innovation that fosters novel interactions among various physical objects. These objects are equipped with sensors, processors, software, and other technologies, enabling them to connect and share data seamlessly. As the adoption of smart devices continues to surge globally, IoT plays an increasingly pivotal role in supporting marketing endeavors. The main advantage of the IoT is that this concept allows for more efficient interaction with the audience. IoT devices can collect valuable data about consumer behavior and preferences, enabling marketers to deliver more targeted and relevant messages.
5. *Big Data*: The impact of data in marketing technology trends increases gradually. Big data and analytics optimize data management and real-time analysis of marketing activities across all channels. Big data refers to the vast troves of data, both structured and unstructured, collected from various sources like social media, Internet of Things (IoT) devices, and mobile gadgets. Big data analytics involves the use of mathematical algorithms and statistical models to scrutinize this data, unearth patterns, and draw conclusions and predictions. In the realm of data-driven marketing, big data and analytics play a pivotal role by enabling marketers to comprehend customer behaviors, preferences, and requirements. One of the primary advantages offered by big data and analytics lies in their capacity to facilitate real-time decision-making.
6. *Immersive Technologies*: Augmented reality (AR) and virtual reality (VR) applications become more feasible, allowing businesses to offer virtual product demonstrations and immersive customer experiences. While AR and VR were once primarily associated with gaming, we see them now transforming industries like retail, allowing for immersive shopping experiences. Augmented reality (AR) overlays computer-generated information onto the physical world in real-time. Users typically experience AR through their smartphone cameras or specialized headsets. By leveraging AR capabilities, businesses can create more engaging, personalized, and compelling customer experiences. Virtual Reality (VR) creates fully immersive digital environments. Users wear VR headsets that block out their physical surroundings and transport them into a computer-generated world. Immersive VR has the power to create memories for the viewer that are as real as an actual real-life experience. It may offer new ways to add the story to advertising efforts and inspire new retail concepts. Augmented reality (AR) and virtual reality (VR) are becoming more accessible, giving businesses of all sizes the ability to create interactive experiences. Figure 2 shows the use of immersive technology [7].
7. *Blockchain*: Blockchain technology is emerging as a tool for enhancing transparency and trust in digital marketing. By providing a secure, immutable record of transactions and data exchanges, blockchain can help agencies combat ad fraud, verify influencer partnerships, and ensure the integrity of customer data. The potential applications of blockchain in marketing are still being explored, but it holds promise for enhancing trust and transparency. Blockchain offers a secure and tamper-proof way to store and track data. It holds promise for agencies that want to differentiate themselves by offering verifiable, trustworthy marketing solutions. This could be beneficial for applications like ad campaign measurement or loyalty programs, ensuring data security and eliminating fraud.
8. *Edge Computing*: Cloud computing revolutionized data storage and processing, but edge computing takes it a step further. It processes data closer to where it is generated, offering advantages for real-time applications.
9. *Quantum Computing*: Quantum computers are a revolutionary technology with the potential to solve complex problems beyond the reach of classical computers. While still in their early stages, their applications in marketing are a fascinating prospect. Quantum computing could revolutionize marketing by enabling the analysis of massive datasets and the development of hyper-personalized marketing strategies at an unprecedented scale.

10. **Biometrics:** Biometric data, such as fingerprints or facial recognition, has been used for secure authentication for some time. Its application as one of our emerging marketing technologies is still evolving, but it holds promise for personalization. Biometric data can be used for secure customer identification and personalized marketing experiences. Imagine loyalty programs that recognize customers through facial recognition, offering them customized recommendations.
11. **Wearable Tech:** Wearable technology trends in marketing allow marketers to reach potential shoppers at the right time in the right place, increasing conversion rates.
12. **5G Network:** 5G makes the Internet much faster. Websites, videos, and ads load instantly. This gives users a better experience. People watch more videos because of 5G. High-quality videos play smoothly. Live streaming works without delays. Businesses use this to share content faster.

#### APPLICATIONS OF EMERGING TECHNOLOGIES IN MARKETING

Data-driven marketing relies extensively on the integration of artificial intelligence (AI) and machine learning (ML) technologies. These technologies serve as indispensable tools for analyzing vast datasets and extracting crucial insights to enhance the personalization and effectiveness of marketing campaigns. They are applied to marketing in the following ways [8-10].

- **Predictive Analytics:** This uses data to forecast consumer behavior, enabling proactive marketing. It employs statistical algorithms and machine learning to analyze big data and identify patterns, relationships, and trends. By using historical data, predictive analytics can predict future events, behaviors, and outcomes, thereby helping anticipate customers' needs and preferences. Predictive models are essential tools for marketers, enabling hyper-targeted strategies and personalized customer experiences. They can forecast customer needs and tailor marketing efforts by analyzing historical data and current trends. The models use machine learning and statistics to extrapolate historical data and forecast future events, allowing marketers to analyze consumer behavior and market trends to inform campaigns and strategies and stay ahead of the competition. By leveraging these advanced data analytics capabilities, marketers can create more targeted, personalized, and effective campaigns.
- **Web Analytics:** Web analytics involves analyzing website traffic data to gain a better understanding of visitors' online behaviors, intentions, and preferences. By examining users' interactions with a website, marketers can discern what customers are seeking and which content they engage with. Companies can track these users' behaviors to gain insights into how they navigate the website and interact with online ads. Analyzing this data can help companies assess the effectiveness of their marketing campaigns and the user experience on the website.
- **Consumer Analytics:** Consumer analytics involves leveraging big data and analytics technologies to gain insights into consumer behavior and preferences across multiple touchpoints and channels. The objective of consumer analytics is to help marketers personalize customer experiences and improve marketing strategies, ultimately leading to increased customer satisfaction. Companies can utilize consumer analytics to segment their target market, personalize marketing strategies and messages, and optimize the overall customer experience. For example, marketers can utilize consumer analytics data from interactions with a company's website or mobile app to identify areas for improvement or pain points.
- **Demand Forecasting:** Demand forecasting integrates historical sales data, market trends, and consumer buying patterns to help both large corporations and small businesses anticipate demand, manage inventory, optimize supply chain operations, and avoid overstocking. AI provides real-time insights into how customers behave all across the sales process, from initial engagement to their final purchase.
- **Social Commerce:** People now shop directly on social media. Platforms like Instagram, Facebook, TikTok, and Pinterest let users buy without leaving the app. Social commerce is the integrative fusion of social media and ecommerce; it is poised to make significant strides in the years to come. This combination allows consumers to make purchases directly from businesses using their social media platforms. Live and non-live streaming on social media for product sales, reviews, and consumer interaction continue to increase revenue opportunities for businesses. Such platforms offer a profitable alternative to paid ads and enable consent-based data collection from users. Social commerce enables brands to create seamless browsing-to-purchase experiences directly within

social feeds, opening new opportunities for engagement and revenue. By embracing social commerce, agencies can help clients reach younger, digitally native audiences and drive conversions in real time.

- *Digital Marketing:* Digital marketing has grown and changed over the years. Marketing has moved from newspapers, TV, and radio to digital platforms. The Internet changed everything. Social media, websites, and search engines became popular. Technology has transformed marketing by making campaigns more personalized and immersive for people and creating ecosystems that are more integrated and targeted for marketers. Digital marketing technologies have become indispensable for franchisors seeking new operators, as well as for franchisees seeking new customers. From social media marketing to geotargeting, artificial intelligence to chatbots, marketing automation and programmatic advertising, marketing executives and operators alike are struggling to keep pace with the changes in digital marketing and figuring out how to balance traditional marketing with the new. Digital marketing is one of the spaces where AI can be a tremendous time saver, particularly with repetitive tasks, such as developing email flows, repurposing and editing content, scheduling tasks, and so on. Marketing technology spend is also likely to rise as marketing budgets grow. Figure 3 shows a representation of digital marketing [11].
- *Mobile Marketing:* This involves sending text messages to customers to promote products or services. Simple text messages can be surprisingly effective for driving engagement and loyalty, particularly for time-sensitive promotions or reminders. Timely messages delivered directly to users' device screens can drive engagement and conversion. Although certain types of mobile marketing may have broader goals, their primary goal is to reach people where they spend time, while creating personalized and relevant experiences that drive engagement and conversions. The mobile marketing landscape is constantly evolving, fueled by rapid technological advancements. The emerging innovations show that the future of mobile marketing is filled with potential.
- *Email Marketing:* More than 40 percent of marketing professionals say email is their top performing channel, and 87 percent say email is critical to their company's success. Small businesses and corporate giants alike are

celebrating email marketing for its excellent ROI. As digital advertising costs rise and the market becomes more competitive, email continues to be very affordable and targeted.

## BENEFITS

Emerging technologies shift marketing from batch processing to real-time, data-driven strategies, requiring marketers to adapt quickly and focus on organizational agility, ethical data use, and delivering meaningful customer value. Other benefits include the following [9,12]:

- *Automation:* Marketing automation platforms have existed for some time, streamlining repetitive tasks. However, the integration of artificial intelligence (AI) has significantly enhanced their capabilities. AI is significantly transforming marketing through the automation of various processes. AI-powered marketing automation can personalize emails based on customer data, optimize ad campaigns in real-time, and even leverage natural language processing to generate content. Campaign management, which historically demanded considerable human effort for activities like A/B testing, data analysis, and audience segmentation, is now becoming more automated.
- *Targeted Campaigns:* In an age of information overload, AI is revolutionizing the way products are recommended to consumers. Businesses are gaining deeper insights into their customers through social media, reviews, and customer service interactions, and this understanding allows brands to tailor messaging to inspire greater customer loyalty. Marketers can cut through the noise to deliver hyper-targeted campaigns that provide the right message to the right audience at the right time. By analyzing data collected from customers, Netflix's AI algorithms generate recommendations tailored to personal preferences.
- *Personalization:* Personalization has traditionally been a fundamental aspect of successful marketing. It is one of the significant opportunities presented by adopting data-driven marketing. With rapid technological advancements and easy access to information, modern-day customers have become increasingly sophisticated, powerful, and knowledgeable. They favor individualization and personalization and prefer companies that directly tap into their individual needs. This consumer is characterized by ever-changing buying behavior, necessitating the identification of the ideal customer and understanding their purchasing patterns. The

integration of AI into marketing augments marketers' comprehension of their target audiences and facilitates the creation and execution of personalized marketing messages and other initiatives. Persona-based customization ensures the right message and content for each persona within complex buying groups, shortening sales cycles and increasing deal success.

- *Data-driven Decision-making:* Data-driven decision-making involves making informed decisions based on data and analytics rather than relying on personal intuition or guesswork. This approach uses data to determine the course of action, make changes, and predict complexities or issues that may undermine the decision-making process. Data-driven marketing practices are associated with better-informed decisions since they are characterized by collecting and analyzing data on customer behavior, market trends, and other relevant factors. Despite its numerous business opportunities, data-driven marketing is not without challenges. For example, generated data's sheer volume and complexity can be daunting, especially for businesses with limited expertise and resources. Data-driven marketing enhances customer relationship management and facilitates customer journey mapping, personalization, data-driven decision-making, and value co-creation.

## CHALLENGES

Audiences are increasingly cautious about how their data is collected and used. Governments are tightening privacy laws, and consumers expect transparency from the brands they trust. At the moment, many marketers are underutilizing AI, but the impact of AI in marketing is already transforming the business landscape, helping leaders make data-informed decisions with greater efficiency and accuracy. Other challenges include the following [12]:

- *Ethical Considerations:* To ensure AI is used responsibly and protects users' rights and privacy, companies will need to establish clear policies and guidelines. Legislative bodies around the world have passed AI-related laws, demonstrating the concern over AI's growing influence — particularly over algorithm bias and data privacy. There is also concern that AI will eliminate certain jobs in marketing, particularly entry-level jobs that focus on basic content creation. While it is true that your job will not be taken by AI, it will be taken by a person who knows how to use

AI. So, it is very important for marketers to know how to use AI.

- *Data Privacy:* One key ethical concern about the growing use of AI in marketing is data privacy. Privacy concerns are at an all-time high, and consumers are demanding greater transparency and control over their data. Sophisticated AI systems rely on vast amounts of consumer data to personalize user experience, but there is growing concern about how this data is collected, used, and potentially misused. Businesses will need to be transparent about their data practices and comply with regulations such as the European Union's General Data Protection Regulation, which protects consumer data across the EU. Marketers are adopting innovative approaches to balance compliance with effective marketing strategies as data privacy concerns grow.
- *Bias:* AI models are trained on data sets to recognize certain patterns or make certain decisions. Training an AI model on data with historical or representational bias could lead to unfair representation or discrimination against certain groups or individuals, eroding trust in AI and damaging the reputations of organizations that use it. This is an important consideration for industries such as healthcare, human resources, and finance that are increasingly turning to AI to inform decision-making.
- *Transparency:* Transparency about data practices is emerging as a competitive advantage in the marketplace. Transparency about customer data collection, storage, and use fosters trust. Businesses often provide value exchanges—such as discounts or exclusive content—to incentivize customers to share their data willingly.
- *Integration:* The real power of technology comes when tools work together. Marketers need integration, workflow, and data connectivity so that components across the ecosystem operate as a cohesive unit rather than a portfolio of tools. Businesses are moving toward marketing ecosystems where automation software, social media schedulers, and analytics dashboards seamlessly integrate. Make sure your systems talk to each other so you can see the full picture of performance. Marketers are in the difficult position of constantly updating and stretching legacy technologies to accommodate a highly dynamic environment.
- *Collaboration:* Collaboration between marketers and engineers is necessary. To understand how to use new technologies for a brand or product,

marketers will need assistance from the information technology, investor relations, and legal departments of their respective companies.

- *Sustainability*: More people care about the environment. They want brands to be responsible. Companies now focus on sustainability and ethical marketing.

Businesses share how they help the planet. They talk about eco-friendly packaging and fair labor practices.

## FUTURE OF EMERGING TECHNOLOGIES IN MARKETING

The landscape of marketing is undergoing a seismic shift, driven by the rapid advancement of technology. From artificial intelligence to blockchain, the tools and strategies available today are transforming how businesses reach and engage with their audiences. As we navigate the digital age, leading companies are harnessing the power of emerging innovations to create more personalized, data-driven, and immersive experiences for their customers. It goes without saying that embracing the future can be an intimidating but rewarding journey. Staying ahead requires not just adapting but actively exploring new technologies. The total cost of investment in new technology is predicted to decrease as economies of scale and competition among service and platform providers increase. An increase in the amount spent on marketing technology will likely occur with a rise in total marketing expenses.

As technological advancements continue to reshape the landscape, the future of digital marketing promises even greater innovation, as shown in Figure 4 [13]. Businesses seeking to stay competitive must not only keep pace with these changes but also anticipate and adapt to the next wave of digital transformation. Future strategies will depend on choosing platforms that not only automate tasks but also provide a clear picture of ROI across the customer journey. Emerging marketing technologies will continue to define the most successful agencies—those that embrace change, deliver exceptional value, and lead the industry forward. Businesses that focus on trust, value, and customer experience will thrive in the future of marketing [13]. Figure 5 shows how emerging technologies are shaping the future of marketing [14].

## CONCLUSION

To stay competitive, we believe marketers need to embrace emerging technologies, prioritize personalization, and adapt to shifts in consumer behavior. From artificial intelligence to immersive experiences, the next wave of marketing tech trends is reshaping how brands connect with customers, build

trust, and drive measurable results. The marketing landscape continues to evolve with new technologies, data deprecation, and sophisticated consumers. Although emerging technologies are reshaping marketing strategy, the heart of marketing remains the same: understanding people and connecting with them in meaningful ways [15]. From artificial intelligence to augmented reality, these technologies are reshaping the way brands connect with their audience, paving the way for a future of marketing that is both innovative and impactful.

Due to emerging technologies, marketing is changing fast. New technology and customer habits are shaping the future. As these emerging technologies continue to develop, they will undoubtedly reshape the marketing landscape. Businesses must adapt to stay ahead. To succeed, businesses must use AI tools, focus on privacy, create engaging content, and connect with customers on multiple platforms. They should stay updated on new trends and test new strategies. More information about emerging technologies in marketing can be found in the books in [16-18] and the following related journal: *Journal on Emerging Technologies*.

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Figure 1 Some emerging technologies [5].



**Figure 2 Use of immersive technology [7].**



**Figure 3 A representation of digital marketing [11].**



**Figure 4 The future of digital marketing [13].**



Figure 5 How emerging technologies are shaping the future of marketing [14].

