# Technology and Its Application in Marketing: Some Insights

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**ARTICLE INFORMATION**

**ABSTRACT**

Information technology and its advancement is helping the growth of service and relationship building among marketers and it changes the way marketing managers do their job. The use of online, websites, online contests, and promotions, etc. are making the marketing concept very challenging. Concepts like quality function deployment and Kansei engineering are used widely to understand customer needs and to translate them into product design. Also, the availability of Computer-Generated Imagery (CGI) offers a smart alternative for marketers who are focusing on the cost benefits of various marketing solutions. The growth of digital marketing is only set to continue and new technologies such as advances in CGI can dramatically cut the cost of creating advertising campaigns. Different quality concepts like quality function deployment, just in time, etc. utilize technology and modern computer software to improve marketing solutions. The study is an attempt to find out the uses of these technological advancements in marketing using a secondary study approach and it is primarily an exploratory study to investigate various uses of modern technology, quality concepts and their applications.

**Keywords:** Computer Generated Imagery (CGI), Deployment Technology, Online Marketing, Quality Function Marketing

## INTRODUCTION

Marketing in the current day and age has become far more than just another business aspect. In 2022 alone 50,44,748 new companies (US Census Bureau) entered the market. In such a competitive environment business cannot thrive just on quality but requires visibility and should have unique utility. The technological evolution in the last few years has been tremendous and has become our trusted source of information, advice, and even opinions. A mediocre brand can enjoy skyrocketing revenue by virtue of intelligent marketing whereas a brilliant idea can go unnoticed due to the lack of correct marketing skills. Traditionally, customers used to prioritize the quality of the item or service, the value it added for its price, the transparency of the brand, and the customer experience. However, now with the increase in competition and abundance of options at the tip of their fingers, customers expect more than just the formerly mentioned qualities. One such brand-new concept is that of "personalization and customization".

Today customers want to feel like their individuality matters to the company and they are not considered just one of many users. Many brands and companies have leveraged this psychological feature to build a personal connection with each of their users while utilizing the data collected to optimize their growth plans. One major instance of this is the music service provider Spotify. Every year Spotify provides a recap of the most played songs of individual users for that year, the most listened-to artists, and much more. This is something people look forward to throughout the year and flaunt their results on social media. This enables Spotify to enjoy the free of cost advertisement and a loyal customer base for the coming year.

Such personalization and customization strategies help companies increase their customer loyalty. With the evolution of technology, artificial intelligence, augmented reality, generative artificial intelligence, and other such contemporary technologies the field of marketing is set to experience a renaissance. In this paper, the use of Kansei engineering, digital marketing, and quality function deployment along with XAI - Explainable Artificial Intelligence and CGI - Computer Generated Imagery and their applications in marketing are discussed.

The primary objectives of this study revolve around investigating technology concepts and their practical applications, particularly within the realms of marketing. The study seeks to delve into the broad impact of technology on marketing practices overall. Additionally, it focuses specifically on how technology contributes to segmentation and market research. By exploring these facets, the research aims to provide insights into the evolving landscape of technological influences on marketing strategies, with a particular emphasis on their role in enhancing segmentation techniques and market research methodologies.

## LITERATURE REVIEW

Post-pandemic technology is being used widely by companies in service delivery (Jais, et al., 2023). This has helped to increase customer satisfaction a lot. Companies are now able to give faster and more reliable service to customers. The resilience of company will be facilitated by digital technologies, offering them effective online tools and business platforms that span internal production processes to establishing connections with the market and clientele (Berawi, 2021). Singh et al. (2021) studied impact of technology on education and how the technology can be leveraged to market and get more students into an institute and how students can be retailed effectively.

### Digital Marketing

Digital marketing can make use of ready-made web designs such as flash templates and websites, which can be quickly and efficiently developed. Additionally, Facebook pages, Twitter feeds, email newsletters, blogs, and Facebook pages can be utilized to market goods and services here. In this field, these are the tendencies. Some of the technologies utilized here, aside from mobile marketing, are listed below.

### *Social Media*

Over the last 18 months, there has been an incredible surge in the creation and utilization of social media. 2010 will see a rise in the usage of social media for marketing, including Facebook, LinkedIn, Twitter, and other platforms.

### *Video Blogs*

A logical development from text-based media is video blogs, or vlogs. Video blogging has been swiftly made accessible by tools such as YouTube.

### *Count of Customers*

Several programs, such as Google's Side wiki, are devoted to the popularity of user reviews. Campaigns that are successful will acknowledge this and come up with creative strategies to obtain favorable client feedback and use it in their advertising efforts.

Bing Microsoft launched Bing in June 2009, and it soon started to increase its market share. It is imperative that marketers consider what makes Bing distinct and figure out how to increase their market share.

Shukulli (2022) in the conference presentation talked about the variety of marketing literature and took a descriptive qualitative approach. The study's conclusions demonstrated that the digitization age, particularly during the Covid-19 pandemic, contributed to the growth of digital marketing. Changes in digital marketing and impact on marketing was analysed by the paper. This is evident from the changes happening in the marketing world. We are using digitization more and making sure that lot of innovations are happening in this area. Yeoh (2022) also studied effect of digital marketing. The article found out that perceived utility, perceived ease of use, perceived security, perceived trust, and social impact were the five main factors on which the study concentrated. Perceived security, perceived simplicity of use, and social influence all have a substantial impact on users' behavioural intention to use the Touch 'n Go e-wallet application in Malaysia, according to our analysis and findings. A number of recommendations were made to improve users' experience and loyalty to the Touch 'n Go application. These consist of making biometric authentication possible, improving credibility and public relations, and streamlining the user experience.

These studies prove the importance of technology and digitization in making experience of consumers better and more reliable. Digital marketing and customization are going to be most important words going forward in the new era. Companies have to focus a lot on these in future to really compete.
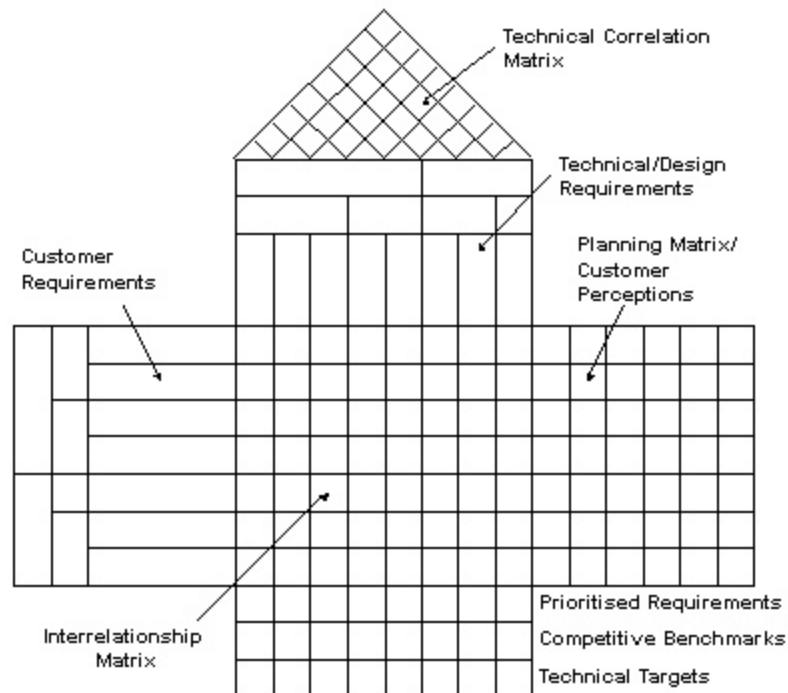
### Quality Function Deployment

Quality Function Deployment (QFD) is a comprehensive framework designed to transform customer requirements into the relevant technical specifications at various stages of product development and production. This encompasses facets such as marketing strategies, planning, product design, engineering, prototype evaluation, production process development, production, and sales (Sullivan in Chan & Wu, 2002).

This concept captures the voice of the customer to translate customer requirements to final product design. It is a systematic process for motivating business to focus on its customers. Primary goal is to overcome three major problems such as (1) disregard for the voice of the customer; (2) loss of information; and (3) different individuals and functions working to different requirements.

There are 4 phases of Quality Function Deployment. The first phase is most important - Product Planning. It consists of the House of Quality. It defines the customers' wants in relation to the product. It finds out the voice of customer by interviews, surveys, and focus groups.

**Figure 1. Steps in Understanding the House of Quality**



Source: Tapke, Muller, Johnson, & Sieck (2013).

Quality function deployment is used by a lot of leading companies to understand customer needs and design products.

**Kansei Engineering**
Kansei engineering is a methodology focused on harmonizing design elements with a user's sensory and emotional responses, with the goal of identifying and assessing novel design solutions (Lévy, 2013). Kansei focuses on comprehending the sensory and emotional demands of clients regarding a good or service and finds distinctive characteristics of these needs that the project team can utilize. Category classification, surveys, statistical analysis, and other conventional QFD tools like affinity and other diagrams are examples of Kansei approaches. These methods assist developers in determining precise requirements to meet the emotional and lifestyle needs of the client.

Contrarily, QFD uses a systematic Voice of the Customer (VOC) analysis and deployment process to identify "unspoken" customer requirements. It also places a greater emphasis on the functional needs of the customer and offers a comprehensive system to ensure that development efforts are in line with project and company goals

throughout the entire development process and organizational system. The complements of QFD and Kansei engineering can add imagination and fun to the product, while QFD can give emphasis on functional superiority and system-wide execution. According to the study by Heinonen (2023), people view mobile channels as more intimate than traditional and email methods. Companies will start using mobile marketing to develop applications that amuse users and raise brand awareness in addition to serving out adverts. This also creates a new avenue for cellular phone service providers to gain a competitive edge by competing not just based on value-added services like brand commercials and other promotional campaigns that they offer to their customers, but also based on price and packaging.

This also brings about a new way for cellular phone service providers to achieve competitive advantage by competing not only based on price and packaging, but also based on the set of value-added services like brand advertisements and other promotional campaigns that they provide to their clients. With the explosion of demand in the mobile market, location-based marketing is set to correspondingly ignite. Services like Loopt, Google Latitude, and Yowza are offering location-based marketing services. Location-based marketing will be used by both passers-by as well as by social networking groups, in the coming year. The marketing firms can incorporate the following attributes in their mobile marketing communications: (1) Personalization: Text message recipients' local time, location, and preferences can be considered by marketers; (2) Time: Businesses need to think about the most effective moment and message to inform clients; (3) Location: The two main justifications for electronic commerce—ubiquity and location independence—are strengthened by mobile phones; (4) Preferences: Messages have more impact when they are personalized; and (5) Customer control, permission, and privacy: All experts agree that before sending out adverts, advertisers should obtain consent from customers and persuade them to "opt in".

According to a recent study by Moth (2014), 28% of businesses are transferring at least some of their total marketing expenses from traditional to digital channels, with digital marketing expected to account for 24% of marketing spending this year. The study drew on a survey of over a thousand businesses worldwide, with the majority having their headquarters in the US (45%) or the UK (33%). Among the important conclusions are that 64% of respondents want to raise their spending for SEO, and 51% for paid search advertising.

Despite acknowledging that they are "poor" at calculating the return on investment from social media, 70% of them intend to raise their spending on off-site platforms like Facebook and Twitter. Spending on conventional media will suffer from budget changes. Just 17% of respondents say they are budgeting more for print media, while 41% say they are cutting back. 40% of respondents to the poll stated that a limited budget for all forms of marketing is the most obstacle to investing in digital marketing.

Consumers place a great importance on product and customer reviews, which significantly influence their purchasing decisions. For instance, Google allows users to post comments on ANY website for other people to see using Google Side wiki. Businesses that are successful will keep an eye on the digital scene, pay attention to what customers have to say, and interact with them directly.

In addition, they will aggressively seek out user input via online forums, crowdsourcing, and other customer-feedback channels. Every month, Twitter receives around 22 million unique visitors. In the US, YouTube has over 100 million users, and 20 hours of new content are added every minute. Real-time marketing updates are available on Facebook and LinkedIn.

## XAI - Explainable Artificial Intelligence

Artificial Intelligence (AI) has gained significant attention in the last few years, and if used properly, it has the potential to significantly improve many industries including marketing. Machine Learning is an intrinsic part of artificial intelligence which serves as the backbone of all the decision-making and data-processing tasks performed by AI. However, the concept of Machine Learning faces a very important challenge of explainability.

Chintalapati and Pandey (2022) explained that artificial intelligence is used in integrated digital marketing, Content marketing, Experiential Marketing, Marketing Operations and Market research by citing different authors who have contributed to this. Different technologies used in marketing were also explained by Hoffman et al. (2022) where he explained different technologies and their area of impetus. Jain et al. (2021) explained the concept of blockchain and how this is used in marketing and other areas of business. These literature reviews suggest that technology has an important role in marketing.

Industry experts, marketers, and the public are often reluctant to use AI for decision-making and lack confidence in trusting the results completely as they are unaware of the background process used by the AI to arrive at that conclusion. XAI or explainable AI is a segment of AI that works to make this background process more understandable and explainable.

The major difference between regular AI and XAI is that the former uses several algorithms to arrive at a conclusion or result and even the AI architects are unable to decipher how exactly it arrived there. The latter, however, attempts to give a stepwise explanation along the way.

This makes XAI highly preferable for important analysis as it improves 3 important things: (1) Accuracy; (2) Reliability; and (3) Traceability.

XAI can be beneficial in a lot of ways as it fixes the loopholes of initial versions of AI by building trust between the user and interface, eliminating risks associated with the use of technology, and improving analytical powers for improved planning.

## RESEARCH METHOD

The study used qualitative research, literature review to be specific, to analyze and gather information. Literature review represents a systematic procedure within the realm of science, generating outcomes in the form of a report designed to facilitate scientific research or direct the focus of a study (Cahyono, Sutomo, & Hartono, 2019). Most utilized word is found out using content analysis. Literature reviews serve a valuable purpose when the goal is to present a comprehensive summary of a specific issue or research problem. This form of literature review is commonly undertaken to assess the existing knowledge and understanding of a particular topic (Snyder, 2019).

## RESULTS

### Use Of XAI in Marketing

As we discussed how explainable AI bridges the gap between the mysterious algorithms of AI and the user, we can utilize the numerous benefits of the technology in marketing and branding. XAI can aid in marketing at different stages such as market research, customer segmentation, customization, and personalization.

### Use of XAI in Market Research

Explainable AI (XAI) offers transparency, interpretability, and insights into the AI models' decision-making processes, all of which can greatly improve the field of market research. Explainable AI can be used in market research in the following ways. Predictive analytics that can be interpreted with the help of XAI. Market researchers can comprehend the elements and characteristics affecting predictive analytics models thanks to XAI. This knowledge is essential for deciphering forecasts and figuring out which factors—like customer behavior or market trends—have the most influence on results.

Since consumer confidence and brand reputation are crucial in the marketing industry, the opaqueness of AI algorithms can frequently cause difficulties. By offering insights into the decision-making process of AI models, XAI fills this knowledge gap. Building trust between a brand and its customers occurs when marketers can articulate the rationale for targeting a certain customer or making a suggestion. Customers are reassured by this openness that their data is being handled sensibly and morally.

### Use of XAI in Customer Segmentation

Customer segmentation is the most crucial role of a marketer and the objective of any marketing strategy. Although a plethora of models exist that work for strategic customer segmentation XAI helps in interpreting those models in greater detail to derive narrowed-down and specific conclusions that will eventually lead to better strategies. XAI technologies are useful in determining and elucidating the significance of various features inside the consumer segmentation model. With this knowledge, marketers can more easily hone and optimize their segmentation approach by knowing which traits or behaviors are driving the segmentation.

The segmentation model's decision-making criteria are made clearer by XAI. This enables marketers to better understand the reasons for a given customer's inclusion in each segment, thereby simplifying the process of customizing marketing campaigns to meet the distinct requirements and preferences of each segment. Biases in the segmentation model can be found and minimized with the aid of XAI. Marketers can address any biases in the data or the model itself by identifying the variables that most influence segmentation outcomes.

### Use of XAI in Personalization and Customization

Explainable AI (XAI), which provides transparency and an understanding of the decision-making process behind personalized recommendations and information, can greatly improve customization and personalization efforts.

By explaining a user's recommendation of a specific item or piece of content, XAI can increase the transparency of recommendation engines. This increases users' faith in the system and enables them to comprehend the foundation of recommendations.

It allows marketers and advertisers to better understand the needs and every customer to increase the relevance of their recommendations. Businesses can boost and optimize the customization process by recognizing how customer preferences and behaviors translate into customized profiles. When user preferences are used to rank content, XAI can shed light on the ranking factors. This makes the process more transparent and user-friendly by making it easier for people to understand why some information is prioritized over others.

## CGI in Marketing

The use of computer graphics, more especially 3D computer graphics, for special effects in movies, TV shows, advertisements, simulators, and simulation in general, and printed materials is known as computer-generated imagery or CGI. Most video games use real-time computer graphics. Given how much a typical advertising campaign costs, it seems likely that businesses will continue to be cautious when approving marketing budgets for a while. Ad campaign creation costs can be significantly reduced by new technology, including developments in computer-generated imagery (CGI). Because of the benefits, location filming becomes less expensive, saving businesses thousands of dollars in overhead.

CGI allows brands to offer extremely immersive experiences that become memorable for the users. When used innovatively, it can create a long-lasting impression of the brand leading to greater brand awareness.

One popular example of CGI in marketing is a campaign run by the luxury fashion brand Jacquemus. In April 2023, Jacquemus launched a CGI ad campaign that showcased their bags in the form of large vehicles driving across the streets of Paris. This campaign generated a lot of conversations over the internet and increased the brand visibility significantly. It also helped create a lasting impression of the brand in the minds of people for a long period. Not just this but it inspired several other brands to use CGI in rolling out innovative branding campaigns across different locations. CGI enables creativity in branding leading to conversation-starter campaigns which are the need of the hour provided the overcrowded market conditions.

## Pygmalion Effect and Marketing

The self-fulfilling prophecy or Pygmalion effect is the term used to describe the phenomena where people perform better or accomplish more when they are held to higher expectations. If a company presents itself as superior in quality, high-end, and luxury, it is likely to attract more customers who expect that from the brand and are willing to even pay a little extra for the added pride in owning the brand. This psychological phenomenon can be used with the help of CGI by creating visual imagery that imprints on the viewers. This way brands can generate lasting impressions and paint the image of the brand as it desires.

Storytelling in branding and advertising has historically proved to be effective as a marketing strategy. Marketers can provide idealized lifestyle images that fit brand storylines thanks to computer imagery (CGI). This can be especially helpful when a business wants to portray a particular ideal lifestyle or when it is difficult to capture real-world locations or scenarios.

Generation of dynamic and interactive 360-degree product views is made possible using CGI. Customers may examine things from various perspectives thanks to this immersive experience, which gives them a more thorough understanding of the product.

Using computer-generated imagery (CGI), marketers may produce realistic and high-quality visuals of products that might not yet exist or are challenging to photograph. This is especially helpful for pre-launch marketing since it lets buyers view precise visuals of products before they are developed.

## DISCUSSION

**Most Utilized Word**
We can see that the most utilized word is use of technology, market and XAI. Technology and experience of using technology have become important parts of marketing now and ways of differentiation. Content analysis and its graphical representation gives the spread of words used in the literature.

**Figure 2. Technology in Marketing**
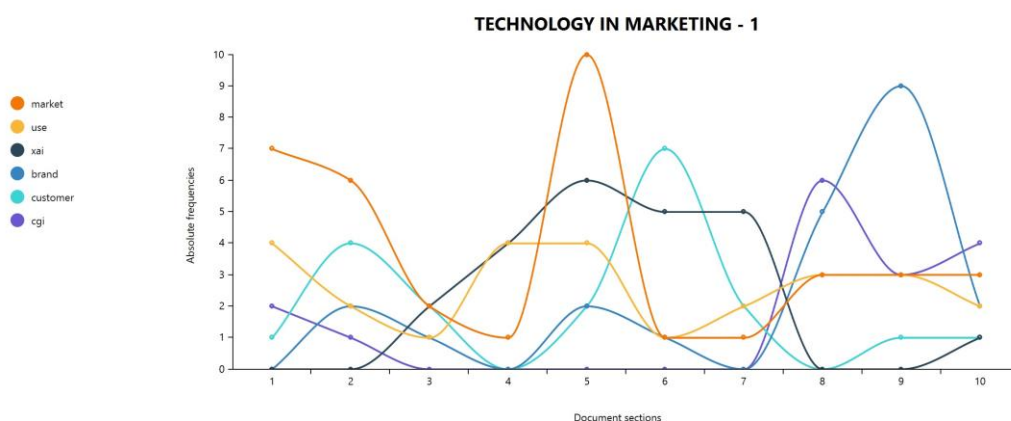


Four trends for the future are (1) Touch: People will be typing in air, and that all manipulation and creation of media and information is going to be multi-touch in a simple and intuitive way; (2) Analytics: As customers will be knowing who is doing what on our websites and who those people are, who they are connected to, how much of an influencer they are and what that could mean to our businesses - all in real time; (3) Location-aware: Twitter and Foursquare (Foursquare is a location based social network that incorporates gaming elements) are used as mobile and location-aware online social networks. These are used to connect and publish to those who are physically close to us and interested in what we sell; and (4) Augmented and Virtual Reality: They are playing crucial roles in advertising and product placement along with branding.

Hoffman et al. (2022) used a literature review as their main method of data analysis and analyzed different articles. These articles showed. the positive feedback loop that occurs when businesses implement new marketing technologies, which increase the volume and quality of market data. This in turn leads to the development of new analytical techniques, which produce fresh insights, which facilitate better marketing decisions, which enhance the gathering of more market data, and so on.

## CONCLUSION

Increasing development in technology is going to rapidly transform how companies perform branding and market research. As short-form content on social media is on the rise, people's attention spans are rapidly decreasing which means it gives companies less time to grab the attention of viewers and embed their existence in the minds of consumers. Newer technologies like XAI and CGI will be at the forefront of marketing campaigns to analyze the consumer preferences, and segmentation and present visual

imageries. QFD, Kansei Engineering, Explainable artificial engineering and other concepts have changed the way marketing is done. Quality function deployment is found to be useful in operations as well as to convert needs of customers into product design. More research can be done in all these areas for better customer acquisition and retention.

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The authors declared no potential conflicts of interest.

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