

## *Recent Computer Applications in Marketing*

Selay Ilgaz Sumer, Baskent University, Turkey  
Emre Sumer, Baskent University, Turkey

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### **Abstract**

Especially in recent years, marketing efforts of businesses have gained more importance along with the intense competition. Creating value to the target market and facilitating the life of consumers have become the primary goals of the firms. There is no doubt that offering simplicity to the consumers will affect the success of businesses in competitive environment. Technology is an important input in the wellness of the firms and customers. Hence, marketing needs to be in a close contact with computer related technologies. Computer science is one of the disciplines that encompasses these technologies and aids the marketing managers' decision process. As a marketing decision maker, it is important to utilize the benefits of recent computer applications. In this study, among these applications, we mainly focus on geographic information systems, computer vision, augmented reality, eye tracking and data mining. These technologies and their complementary roles in marketing will be discussed in detail along with the real life examples. It is believed that the study is expected to draw managers' attention and thus, support the survival of the firms by satisfying the consumer expectations, maximizing profits and creating a value to the target market.

Keywords: Marketing, businesses, computer related technologies

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## **Introduction**

In today's world, consumer's needs and expectations have changed a lot. Based on this turbulent environment, businesses have started to spend their effort to meet the target markets expectations and needs. Herein, technology aids businesses to struggle with these various wants. As time pass by, technology is started to affect functions of the businesses differently.

Marketing is one of the functions of business affected by technological changes. In the concept of societal marketing three main considerations were society, consumers and company. According to the societal marketing concept, companies could gain profits by satisfying the consumer's wants and creating welfare for people. At this point, by the help of the technology it could be possible to make both companies and consumers happy.

Decision makers have to integrate technology and marketing in order to increase the value of marketing efforts of the firms. Especially in recent years, in the marketing literature it is started to emphasize that the focus of marketing is creating value to the consumers. By the help of the computer related technologies, value creation is started to be easier and content of marketing activities are started to change. In other words, computer related applications have an important role in the reshape of marketing efforts of the firms. Today, it is easily seen that many computer applications are used in the marketing activities of the businesses. Apart from these, utilizing from computer related technologies present both firms and consumers various advantages. Therefore, in order to take effective marketing decisions, using technology in marketing activities would be so important.

In this paper, especially the contributions of computer related technologies from the side of businesses have taken into consideration and discussed. Primary aim of the study is to provide some information to the marketing decision makers about the computer related technologies that ensure success in the competitive environment. For this purpose, we mainly focus on computer related technologies such as geographic information system, computer vision, augmented reality, eye tracking and data mining. In the study, mentioned computer applications in marketing side are examined. First of all, the definitions of computer applications are introduced. Following the definitions, applications of computer related technologies in marketing are examined separately.

## **Definition of Marketing**

Contemporarily, marketing has a precious place in the daily activities of businesses. At one time, marketing is thought as a business function that only promotes the goods and services of the firms. However, meaning and function of marketing has changed a lot in recent years. In other words; being value oriented, solving the problems of the consumers in a short time, developing and maintaining long term customer relationships have gained more importance than before. These points have caused some changes in the definition of the concept.

In the literature, various definitions of marketing can be found. Grönroos (1990: 138) states that "marketing is to establish, maintain and enhance relationships with

customers and other partners, at a profit, so that the objectives of the parties involved are met”. Kotler and Armstrong (2012: 29) defined marketing as “the process by which companies create value for customers and build strong customer relationships in order to capture value from customers in return.” According to the definition of American Marketing Association which was approved in July 2013 “marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large.”

## **Technology and Marketing**

Technology can be defined as “know-how, more specifically, as the information required to produce and/or sell a product or service (Capon & Glazer, 1987: 2)”. Like in the every functions of business, also in the activities of marketing some changes have occurred. In satisfying the changing expectations of consumers, catching up the technological changes and implementing them in the field of marketing is very important.

Technological developments affect the various marketing related activities of the businesses. Major influences can be listed as below (Capon & Glazer, 1987: 3):

- Changing the product life cycles
- Changing the definition of market segments
- Causes new sources of competition
- Creating changes in the structure of the businesses and its functions
- Leading to increased globalization of markets

Contemporarily, in the field of marketing most of the computer related technologies are used intensely. In other words, marketers have started to integrate their activities through various computer related technologies to gain more efficiency in marketing activities (Quesada-Pineda, Brenes-Bastos & Smith, 2017). Geographic information system, computer vision, augmented reality, eye tracking and data mining are a few of them which were examined in this study.

## **Geographic Information System in Marketing**

Geographic Information System (GIS) “is a spatial information system used to import, edit, visualize, analyze, and output spatial and non-spatial information stored in a computer database (Jensen & Jensen, 2013: 21).”

Geographic information systems provide important information both to service providers and consumers. Instead of using traditional forms of marketing, geographic information system based marketing approaches become more popular. This allows visualizing the locations of customers by analyzing their demographic, purchasing and spending characteristics. A geographic approach to reach the target market is summarized in four steps (ESRI, 2010):

- 1) *Monitor the customers:* The largest concentrations of the customers are located by map analysis.
- 2) *Profile and segment:* With the help of geographic customer databases, each transaction can be analyzed to identify the customers and their buying habits.

- 3) *Understand needs and behaviors*: The wants and needs of the customers are matched with products and offerings.
- 4) *Find and target*: Targeting new customers with similar interests and needs is provided by customer segmentation based on geographic characteristics.

Marketers can also utilize geographic information systems in certain situations such as (Jensen & Jensen, 2013: 209-222);

- Service area of a particular facility
- Location-allocation modeling for facility location
- Maximization of market share
- Target market share

Specifying service area of a particular facility is one of the most often used network analysis applications in GIS. Facilities like restaurants, automated teller machines or police stations can be considered as geographic features. The aim is to find a geographic region that encompasses the network that can be reached within a value such as travel time or distance away from the facility. In a different application, location-allocation modeling for facility location is considered. This application aims to find the best location for new facilities that will service. Maximization of market share can be used to solve competitive facility location problems. In the presence of competitor facilities, it is aimed to select the optimum location for new facilities that maximize market share. Similarly, in target market share problems, a specific target market share (e.g. 60%) is identified. To reach the specified target market share, the minimum number of facilities is chosen as candidates (Jensen & Jensen, 2013: 209-222).

In tourism marketing, retrieving information related to tourist locations and presenting visual images or digital videos for tourist sites are the basic applications for tourists who utilize GIS. In a specific study, a GIS-based information system is proposed to enhance the competitive advantage of travel agencies. It is aimed to meet the sophisticated expectations and needs of the customers who make their reservations through travel agencies. The proposed system enables queries on geographic features to retrieve lodging properties and certain geographic information around a location (Ilgaz Sümer, Sümer & Atasever, 2015).

### **Computer Vision in Marketing**

Computer vision is the second computer related technology that could be used in marketing. “Computer vision (or image understanding) represents a subfield of Artificial Intelligence (AI) which aims at the analysis and interpretation of visual information (Schierwagen, 2001: 3).” There are a variety of applications where marketing intersects with computer vision such as interactive billboards, retail optimization analytics, tourism marketing.

In our daily life, we are frequently confronted by thousands of billboards everywhere we go. Hence, it is so difficult to attract the awareness of customers. By the help of the interactive billboards it could be easy to pull in consumers. There are a variety of smart advertisement billboard applications based on computer vision techniques. Among these attempts, most of them are based on the recognition of age and gender

(Demirkus, Garg & Guler, 2010). Besides, the promotional messages can be sent by developing the customer profiles through the detection of accessories worn or some facial features. Once the analysis of the customers is completed, the smart billboard systems suggest pictorial or video advertisements immediately.

On the other hand, retail optimization analytics which enables to understand the shopper behavior and store operations become easier with computer vision. With this technology, demographic analysis of customers can be done easily. Besides, customer lines at registers, door entry points or return counters can be monitored. Extraction of foot traffic patterns and occupancy rates can be easily performed by retail optimization analytics (Senior *et al.*, 2007). Finally, shopping dwell time, which can be regarded as a powerful metric in revealing the behaviors of customers, can be estimated with computer vision algorithms (Video Intelligence Platform, 2017).

Computer vision also enriches and facilitates tourism marketing by analyzing and interpreting the visual information. In a specific example, a smart hotel room automation system is developed (Ilgaz Sümer, Uğur & Sümer, 2016). Hand gestures are recognized by computer vision techniques. Using the signals generated by the predefined hand gestures, the guest can control the peripherals located in the room. With this system, lodging properties can gain competitive advantage and reduce their costs to a certain extent.

### **Augmented Reality in Marketing**

Augmented Reality (AR) or Mixed Reality (MR) is another computer related technology that could be used in marketing. Augmented reality “is a new technology that involves the overlay of computer graphics on the real world (Silva, Oliveira & Giraldi, 2003: 1).”

Experiential marketing applications are the typical examples of augmented reality practices in marketing. According to Wu and Tseng (2015: 105), experiential marketing is defined as “to create a unique experience for customers and induce their purchase intentions by getting them to sense, feel, think, act, and relate.” Augmented reality can be used as a promotional tool in experiential marketing. Moreover, it can create customer satisfaction by experiencing products. Augmented reality can also provide personalization and can be used as a contemporary tool in marketing (Jin & Yazdanifard, 2015).

In particular, virtual mirror technology is an interactive image technology, which allows consumers to personalize virtual models and to try on products in a virtual setting (Cho & Schwarz, 2012). In a preliminary work conducted by Özüdoğru *et al.* (2016), a virtual mirror system for eyewear is proposed. In this system, customers can select glasses, sun glasses or contact lenses from the product range. Then, a portrait photo is taken by the system and customers can try the selected products on their photo. Additionally, customers are able to purchase the experienced products and share them via social media. The developed system is believed to enhance the interaction between business and customer.

## **Eye Tracking in Marketing**

Eye tracking is the fourth computer related technology, which is examined in this study. Eye tracking “commonly refers to the technique used to record and measure eye movements (Tobii Technology, 2010).” Eye tracking offers an objective way to measure person’s visual attention in a scene. With the advances in eye tracking technology, there are several number of studies based on the combination of eye tracking and human behavior. Marketing is one of the major disciplines for eye tracking research. In the literature, it is reported that most of the approaches of eye tracking mainly focus on online advertising, digital marketing and shopper marketing (Borys, 2014).

In marketing and consumer research applications, consumers’ attention and spontaneous responses are measured by eye tracking technology. The data collected by the shopper’s eye help marketers to communicate with their customers effectively. In the field of shopper research, eye tracking is used to estimate the shopper behavior. This information is valuable for positioning products and marketing. To sum up, the use of eye tracking technology in marketing provides; how shoppers navigate the shelves in a store, which visual elements are noticed or ignored and how shoppers interact with products on the shelf.

## **Data Mining in Marketing**

Data mining “is the exploration and analysis of large quantities of data in order to discover meaningful patterns and rules (Radhakrishnan, Shineraj & Anver, 2013: 41).” Actually data mining is one of the efficient ways of communicating with customers. Especially in direct marketing campaigns, customer related information such as name, address, phone number, e-mail address can be obtained easily (Radhakrishnan, Shineraj & Anver, 2013: 43-45). Besides that electronic customer relationship management (ECRM) activities have gained importance with data mining. Satisfying the needs of the customers leads to create loyal customers (Scullin et al., 2010). Furthermore, using data mining in marketing activities enables firms to contact with true customers. Stored data provides to create strong relationships with them. Usage of the collected data helps to make some assumptions about the expectations of the consumers and create awareness (Radhakrishnan, Shineraj & Anver, 2013: 43-45)

Data mining is used in various marketing applications such as planning for a new product introduction, improving direct marketing campaigns, customer churn analysis and evaluating results of a marketing test.

## **Conclusion**

Marketing is essential to the success of the businesses. In today’s world marketing activities integrated with technology bring more success to the marketing departments of the firms. Therefore, decision makers must be educated on the topics such as the relationship between technology and marketing, importance of technology in marketing and technological applications in marketing etc.

In this study especially the computer related technologies such as geographic information system, computer vision, augmented reality, eye tracking and data mining are discussed. As it was denoted before, each of these technologies effect the marketing activities of the businesses positively in a differential manner. Computer related technologies both decrease the cost of the marketing activities and promotes the marketing activities of business. In this study only five computer applications were discussed. Moreover, this is the major limitation of the study. It is believed that in the future, along with the new technological developments marketing function of the businesses will gain important acquisitions and be modernized.

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### **Internet Resources**

“Definition of Marketing” by American Marketing Association:  
<https://www.ama.org/AboutAMA/Pages/Definition-of-Marketing.aspx>

“GIS for Marketing” by ESRI:  
[www.esri.com/library/brochures/pdfs/gis-for-marketing.pdf](http://www.esri.com/library/brochures/pdfs/gis-for-marketing.pdf)

“Retail Optimization Analytics” by Video Intelligence Platform:  
<http://www.3vr.com/sites/default/files/assets/retail-optimization-analytics-datasheet.pdf>

“Tobii Eye Tracking—An introduction to eye tracking and Tobii Eye Trackers” by Tobii Technology:  
<http://www.acuity-ets.com/downloads/Tobii%20Eye%20Tracking%20Introduction%20Whitepaper.pdf>

**Contact email:** [silgaz@baskent.edu.tr](mailto:silgaz@baskent.edu.tr)