

Predicting the actual behavior of customers to purchase through an online platform

Yuan Yuan LIU

Faculty of Engineering Economics and Management, Riga Technical University
Riga, 6 Kalnciema Str., LV-1048, Latvia
Baltic Sea Region Research Center, Guizhou University, Guiyang, 550025, China

Natalja LACE

Faculty of Engineering Economics and Management, Riga Technical University
Riga, 6 Kalnciema Str., LV-1048, Latvia

ABSTRACT

Nowadays, artificial intelligence is no longer a new concept. With the development of science and technology, the application of artificial intelligence in marketing and other business fields has gradually expanded. The predictive power of artificial intelligence in customer purchase behavior has expanded thousands times. AI technologies, such as face recognition, advertising, and content precise delivery are constantly changing people's lives. For many commercial firms, artificial intelligence technologies are changing the marketing strategies and the rules of business. As new applications of artificial intelligence continue to emerge, there is an increasing interest to explore how predictive it is in customer online purchase behavior. The study aims at presenting the conceptual framework of artificial intelligence, revealing its working mechanism in combining customers and firms, showing the machine learning algorithms predicting customer purchase behavior. The study takes one of the smart tourism destinations and its artificial intelligence technologies' performance in selling tickets during a 5-day "May Day" holiday in China in 2021, which further explains the intelligent marketing and the future trends of artificial intelligence influencing firms' and customers' marketing strategies and daily life.

Keywords: artificial intelligence, social networking sites, customer behavior, machine learning algorithms, customer purchase predictions

1. INTRODUCTION

Artificial Intelligence (AI) technologies have been widely applied to enable organizations to manage large amounts of data in real time. Artificial intelligence could be understood and defined as a technology or a machine [1]. Researchers also defined that artificial intelligence in terms of tasks which if conducted by a human would require intelligence to compete [1]. As artificial intelligence technologies are applied to promote the marketing discipline [1; 2; 3], marketing activities generated by artificial intelligence technologies have aroused hot topics in researches and practice, such as segmenting social media users [4], boosting sales, and improving selling processes [5], and generating

two-sided market (e.g., B2B markets) of smart tourism, as well as creating platforms [6; 7]. Information processing systems enabled by artificial intelligence improve the performance of marketing activities [1]. The artificial intelligence could be embodied within a machine (robotics) or distributed within a system [1]. Data generated by artificial intelligence could be the most predictive [8], while new information could be developed by itself, which makes a competitive advantage for organizations [2].

The working mechanism of artificial intelligence is "Stimuli-Organism-Response" [9]. "Stimuli" is an organism which leads to behavioral avoidance or approach responses according to the environment at the cognitive, affective, and physiological levels [9], which has been widely adopted by examining customers' interaction with the environment [10]. In digital environments, "stimuli" represents the speed of connection and website availability, while recognizing the existence of more active signs and artifacts, such as customer-generated content and comments [10]. "Organism" represents the artificial intelligence itself in information processing systems and enables a powerful framework to theorize how the customer and company interact. Gamberini & Spagnoli (2016) claimed that users' consciously and unconsciously generated data allows artificial intelligence systems to elaborate solutions and make decisions based on that data [11]. "Response" is either an approach or avoidance behavior, which is related to the enhancement or hindrance of online customer engagement behaviors.

Therefore, the conceptual framework of artificial intelligence influencing customer engagement is adopted [1]. Figure 1 shows the conceptual framework. In explaining the framework, "stimuli" represents online customer engagement behavior (OCEB), including unsolicited OCEB (activities and engagement from the customer side) and solicited OCEB (activities initiated by firms). Artificial intelligence "organism" enables information processing and generate real-time customer insights. Meanwhile "responses" could be either automated firm response or manual firm response. The predictive power of artificial intelligence is reflected by the conceptual framework. Those three parts are shown in the figure below.

Figure 1 shows these three parts respectively.

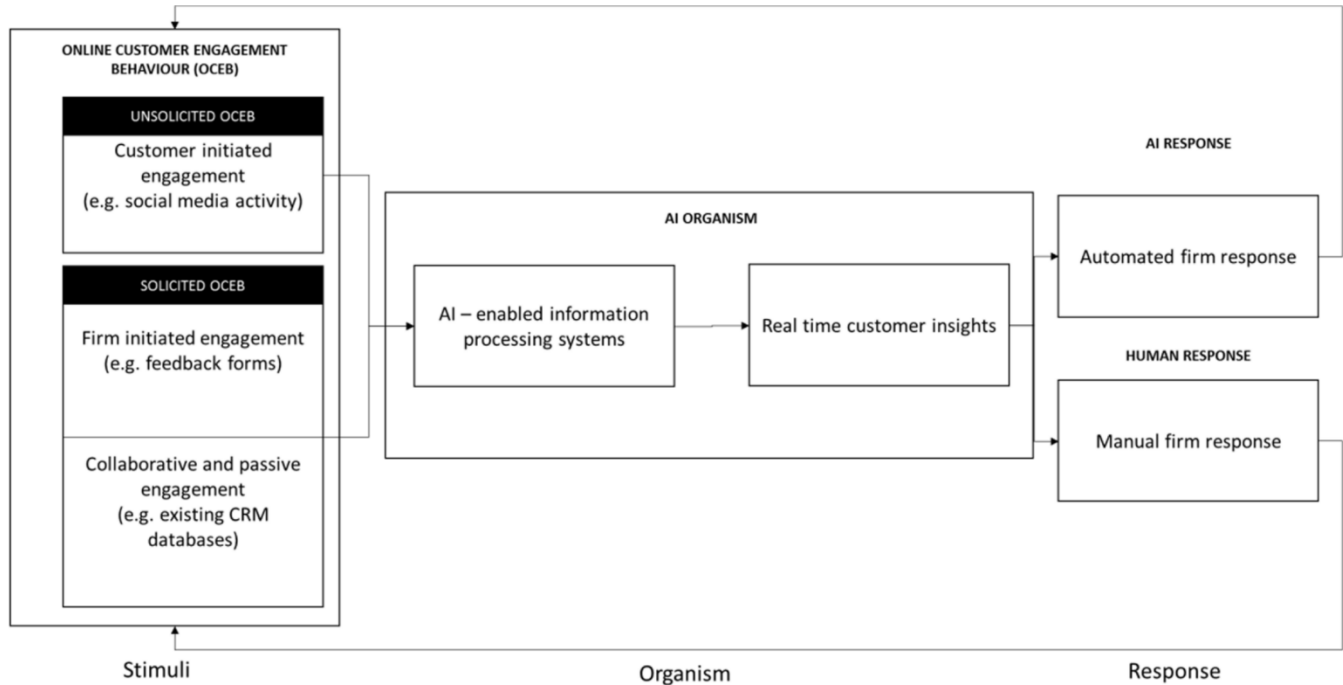


Figure 1 The conceptual framework of artificial intelligence influencing customer engagement

The study is carried out examining the predictive power of artificial intelligence on actual purchasing behavior when it is applied to an online platform which promotes the smart tourism destination. The study takes Tian He Tan attraction as a smart tourism destination and investigates the predictive power of its artificial intelligence on customers' actual behavior of purchasing tickets via online platforms during the "May Day" holiday of China in 2021.

Tian He Tan attraction is one of the most famous natural tourism destinations of Huaxi District of Guiyang City, Guizhou Province, China. Thanks to its karst region landscape features with rivers surrounded, Tian He Tan is very attractive to tourists. Besides, the cultural essence in Huaxi District also plays an important role in attracting tourists. Tian He Tan was created as a smart tourism destination and was promoted by an online platform marketing campaign during the 5-day "May Day" holiday of China in 2021. Totally 0.185 million tickets were sold out via the online platform during the holiday, and an average of 3,7000 tickets were sold per day. The attraction is applying artificial intelligence for its social networking sites and the ticket selling system.

Accordingly, the research questions are:

- 1) How artificial intelligence predicts the actual behavior of customers (tourists) to purchase tickets to a smart tourism destination through an online platform?
- 2) How to employ artificial intelligence for facilitating customer engagement?
- 3) How artificial intelligence provides customers' purchasing intentions to right transaction processes in real time?

2. PURCHASING TICKETS FOR THE SMART TOURISM DESTINATION THROUGH ONLINE PLATFORM

Social networking sites (SNSs), such as Wechat, Facebook, Twitter, or Instagram have attracted and altered the behavior of customers, although there are differences among them, but they act consistent in promoting e-commerce [12; 13; 14]. Social networking sites allow individuals to develop personal profiles and share with others, and therefore circulate connections with others within the system [12]. Personal information, preferences, and transaction information are installed as data and calculated by algorithms of artificial intelligence. The purchasing decisions are influenced no matter the customers are conscious or unconscious. Artificial intelligence provides guidance in purchasing decisions [15]. According to Figure 1, the conceptual framework of artificial intelligence reflects the connection of both customers and firms, and actually social networking sites attract customers and firms as well [1]. Social interaction, social media, and

commerce activities are the three main elements that constitute commerce platforms [16; 17; 18; 19]. Remaining connected with others [15; 20], obtaining information on services, products, and transaction-related information [21] are the main functions of social interaction.

In marketing researches, models and tools to understand **customer behavior** have been developed [22]. Customer behavior, such as purchasing, customer satisfaction, customer trust, repurchase intention, word of mouth (WOM), and site revisit have been studied by researchers [23], while

web design, customer service, security privacy and fulfillment are factors influencing customer behavior [23]. Items, such as information quality, web aesthetics, purchase process, and delivery condition are the essence influencing the four factors mentioned above. Table 1 [23], showing the essence influencing customer behavior.

Table 1
Factors and items influencing customer behavior

Factors	Items
1. Web design	Information quality
	Web aesthetics
	Purchase process
	Website convenience
	Product selection
	Price offerings
2. Customer service	Website personalization
	Service level
3. Security privacy	Return handling
	Security
4. Fulfillment	Privacy
	Timeliness of delivery
	Order accuracy
	Delivery condition

Source: created by the authors

Collecting and analyzing customer data can help marketers accurately understand customer behavior and deliver perfectly customized marketing information to the right customers at the right time. And with the help of big data to achieve precision marketing and diversified marketing. Clearly, with the help of big data and the continuous enrichment of firm data dimensions, intelligent marketing has brought faster innovation and development for firms, which makes firms in the early stage of intelligent transformation move from gradual innovation to intelligent transformation in a real sense. Taking market products as an example. Firms are looking for business growth points, so intelligent marketing ability becomes the core, and the application demand of intelligent marketing system is wide.

3. PREDICTING THE ACTUAL BEHAVIOR OF PURCHASING

The research was carried out based on a digital campaign for smart tourism and on-line purchasing for Tian He Tan attraction in Huaxi District, during a 5-day “May Day” holiday in 2021. The figure below shows the pages of the digital campaign on social networking sites Sina(Guizhou), Wechat, and Tiktok. The pages show not only the promotion of Tian He Tan attraction but also the further ticket and booking system of the attraction. Online purchasing could be achieved by clicking the links. The links represent different types of tickets. The digital campaign, the presentation of brands, and the tickets booking system of Tian He Tan attraction are advertised on the social networking sites.

Customer purchase prediction aims at predicting customers’ future purchases [24], which could conduct future commercial activities. Machine learning algorithms are methods for accurate prediction of customer purchases. The digital campaign created an ecosystem combining machine learning algorithms and together with artificial intelligence connecting “customers (tourists)” and Tian He Tan attractions. Data, such as pictures, online comments, and web search queries are collected and analyzed to serve the predictive power of artificial intelligence.

The essence of marketing is to spread the right contents or idea to the people who need it. Traditional marketing strategy thinking is a high-quality combination of resources, widely covering consumers. The biggest purpose of intelligent marketing is to seek the overall cost performance under constraints and use the basic algorithm model of combination optimization to help customers achieve more optimized goals without spending more money. Marketers can obtain relevant data and suggestions through a variety of artificial intelligence, and quickly establish a relationship with consumers, get their favor, and send them marketing information. Take advertising as an example.

Artificial intelligence improves marketing efficiency in today's time of complex information, and besides, intelligent marketing can quickly choose the most effective way of communication in the case of limited budget, and can quickly check and accept the results and iterate the contents. Its emergence not only greatly shortens the marketing link, but also makes use of intelligent technology to quickly check and iterate, and then detonates some demands on intelligence at the fastest speed. Furthermore, intelligent marketing can be interactive. One of the features of intelligent marketing is interaction. The core of artificial intelligence is that it can think like human beings and interact with people from their demands. In the process of interaction, people's needs are gradually stimulated.

However, there are three conditions for the implementation of intelligent marketing. The first condition for the implementation of intelligent marketing is scenario. Intelligent marketing needs specific scenarios. If the user just takes a glance, it can not meet the demand of intelligent interaction. In fact, it is to bring the user into the scene with intelligent conditions, and then convey the content to the user. The second condition of intelligent marketing is data. The second is data. Only when you collect enough samples can you better match users. Intelligent marketing landing condition three: carrier, so the third is the carrier. Marketing should be based on the carrier to play the effect, but intelligent marketing on this aspect is higher.

Tian He Tan attraction employs artificial intelligence to install and use data and information. Users’ generated data and information are processed by artificial intelligence technologies by applying the “SOR” model. Artificial intelligence enables the effectiveness of marketing with science and technology. It plays an essential role in

marketing. At present, the pace of people's lives is speeding up and their living standards are steadily improving. In this environment, firms like Tian He Tan management and marketing are facing different development opportunities. From the extensive promotion of e-commerce, education, tourism, and other industries. It can be found that artificial intelligence has been integrated into the field of marketing and can be seen everywhere. There is no doubt that artificial intelligence has enabled the effectiveness of marketing with science and technology. For marketing, the most exciting thing that artificial intelligence brings is that it can manage customer interaction on all channels in real time. The key to the success of Tian He Tan attraction is whether they can adjust their strategies in response to customer feedback. For those destinations who are willing to listen to customers, artificial intelligence can provide meaningful customer data and improve the effectiveness of marketing strategies.

4. CONCLUSIONS

Efficient communication

Now-a-day, many firms have integrated artificial intelligence to replace artificial customer service. Intelligent response for member marketing and customer service effectively guides the marketing transformation of FIRMS and effectively helps firms solve the problem of cost conversion. At present, an AI intelligent robot named "Zhituo" has been applied in many firms in China. Firms add a number of artificial intelligence technologies such as natural language generation, speech recognition, and semantic understanding on the basis of the call center system, and replace manual call answering through intelligent outbound calls and automatic response, which greatly enhance customer experience, and improve marketing efficiency.

Intelligent classification and precision marketing

Matching the needs of users and achieving precision marketing are the most popular marketing methods. AI intelligent robot can intelligently classify the customer data according to the set rules and dimensions, while effectively screening out the intended customers and quickly follow up the precision marketing, which helps firms reduce costs and increase efficiency, and highlight their core values.

Positioning target users

Through artificial intelligence, we can make effective use of big data. Just one click to start, the intelligent robot will automatically group call the targeted customers with human voice, and the whole process has recording and text translation, which can be monitored and viewed in real time. At the same time, we can achieve the purpose of marketing service of intention customer screening, customer targeting, and accurate customer classification, it greatly improves the input-output ratio of marketing.

Precision marketing created by big data analysis is promoting the progress of firm intelligence. Under the pressure of performance and revenue, the pace of marketing reform of small and medium-sized enterprises is accelerating. The subversion of artificial intelligence on marketing is based on the fact that artificial intelligence technology can solve the marketing dilemma that traditional marketing mode is difficult to really obtain customer behavior preference information, and combine with big data analysis to create enterprise precision marketing to win customers and quickly tap potential business opportunities.

The advantage of AI application in marketing is that it has the inherent ability to analyze data in scale and real time from a wide range of customer behavior, business and channel sources. The core elements are based on artificial intelligence, big data, cloud computing, and other core technologies throughout the entire customer life cycle, and it provides firms with dimensional customer acquisition, clues, a variety of tools to reach customers in an all-round way, quickly complete customer portraits, screening customers, transaction, retention, promotion to repurchase, and helps enterprises improve revenue efficiency and reduce operating costs.

There are trends of artificial intelligence in the marketing domain. In the era of artificial intelligence, the development of technology enables marketing to have more imagination. Automation, accuracy, and intelligence will become the three key words of the future development of artificial intelligence in marketing. Based on this future intelligent marketing may move towards the intelligent marketing system and help firms gain giant insights into more accurate user needs. Traditional industries are bound to substantially integrate artificial intelligence technology and business processes, so that firms can fully enter the era of intelligent marketing and promote performance growth. It is believed that future artificial intelligence technology will play a greater role, enabling marketing more directly.

AI will completely change the four ways of marketing industry.

Transformation 1: machine learning. It is increasingly easy for ordinary consumers to obtain artificial intelligence technology, so that they can better understand and participate in multimedia content. Machine learning technology is the core of this revolution. Amazon Web services (AWS) and other suppliers have developed AI authorized machine learning tools, which can be easily mastered by any organization. For example, digital advertising agencies use this resource to optimize advertising budgets across multiple touchpoints. Suppliers even set up simulation scenarios so that marketing executives can easily understand how to make most of the technology.

Transformation 2: use big data to identify the equality gap. In the context of artificial intelligence, it is important to understand how to provide digital access for all in terms of

fairness and inclusiveness. As with previous technologies, AI is becoming cheaper and cheaper. Analysts predict that the technology to analyze and evaluate large amounts of information will soon be in the financial hands of ordinary citizens and business owners. At the same time, individuals and businesses must maintain the control and security of their data. For example, data owners can describe the information they provide to the public as well as the information they keep confidential or in-house. In addition, people and organizations can promote inclusiveness and fairness by supporting open source development at all stages of AI implementation, and the public has to use free AI training to understand and effectively use the technology.

Transformation 3: improve the efficiency of buyers and sellers. The value of any data assessment relies on how business leaders act on the generated reports. As a result, savvy marketers have to know what information can provide the most complete picture of the demographic data they need. By using purchase and marketing information as well as website analysis, decision makers can figure out what data exists in their stores, which will help them better predict who is more likely to respond to brand information. In addition, marketing leaders need to use their customer relationship management (CRM) platform to manage all consumer transactions and participation. With this resource, managers will have everything they need to find insights that have not been discovered before, and to predict the most meaningful profitable action plan. By making full use of existing data to store and mine information about new opportunities, marketing leaders can effectively promote these results.

Transformation 4: consumer demand will be the first. Marketers are happy to be able to put the right product in front of the right people at the right time. With the help of artificial intelligence, marketing personnel with forward-looking thinking believe that there are unlimited opportunities in the future. Customers will have full access to the information. Humans do not know what they want until they see it. AI may soon become the perfect Butler, predicting every demand a customer might imagine. This may include product information that pops up accurately when needed, regardless of the customer profile or their stage in the buyer's journey.

In fact, some analysts predict that predictive power of AI technology will be so effective that it will quickly predict the needs of consumers and automatically order products. In addition, AI housekeeper can quickly order quality services at the best price and ensure that important features such as warranty and warranty are provided. Artificial intelligence not only redefines firms - it also reveals to customers the meaning of human beings. Mechanical innovation has redefined human nature over the past 60 years. In these changes, human beings have to adjust their unique thinking. Over the next decade, analysts foresee a society in an identity crisis, as artificial intelligence technology takes on many human roles. However, they believe that the utility and productivity of AI technology will make these problems

almost silent, because people learn to redefine the meaning of human beings in a world of unlimited duration, promotion, and responsibility.

5. ACKNOWLEDGEMENT



This work has been supported by the European Regional Development Fund within the Activity 1.1.1.2 “Post-doctoral Research Aid” with the Specific Aid Objective 1.1.1 “To increase the research and innovative capacity of scientific institutions of Latvia and the ability to attract external financing, investing in human resources and infrastructure” of the Operational Programme “Growth and Employment” (No.1.1.1.2/VIAA/3/19/479).

6. REFERENCES

- [1] R. Perez-Vega, V. Kaartemo, C.R. Lages, N.B. Razavi & J. Männistö, “Reshaping the contexts of online customer engagement behavior via artificial intelligence: A conceptual framework”, *Journal of Business Research*, 2021, Vol. 129, pp. 902-910.
- [2] V. Kumar, A. Dixit, R.G. Javalgi & M. Dass, “Research framework, strategies, and applications of intelligent agent technologies (IATs) in marketing”, *Journal of the Academy of Marketing Science*, 2016, Vol. 44(1), pp. 24-45.
- [3] J. Van Doorn, M. Mende, S.M. Noble, J. Hulland, A.L. Ostrom, D. Grewal & J.A. Petersen, “Domo arigato Mr. Roboto: Emergence of automated social presence in organizational frontlines and customers’ service experiences”, *Journal of Service Research*, 2017, Vol. 20(1), pp. 43-58.
- [4] A. Culotta, N.R. Kumar & J. Cutler, “Predicting the demographics of Twitter users from website traffic data”, *In Conference proceedings of the twentieth AAAI Conference on Artificial Intelligence*, Austin, Texas, pp. 72–78.
- [5] N. Syam & A. Sharma, “Waiting for a sales renaissance in the fourth industrial revolution: Machine learning and artificial intelligence in sales research and practice”, *Industrial Marketing Management*, 2018, Vol. 69, pp. 135–146.
- [6] J.K. Yadav, D.C. Verma, S. Jangirala, S.K. Srivastava, “An IAD framework for Blockchain enabled smart tourism ecosystem”, *Journal of High Technology Management Research*, Vol. 32, 2021, 100404.
- [7] F. Hawlitschek, B. Notheisen, & T. Teubner, “The limits of trust-free systems: A literature review on Blockchain technology and trust in the sharing economy”, *Electronic Commerce Research and Applications*, 2018, Vol. 29, pp. 50–63.

- [8] J. Sterne, **Artificial intelligence for marketing: Practical applications**, 2017, Hoboken, N.J.:John Wiley and Sons.
- [9] A. Mehrabian & J. A. Russell, **An approach to environmental psychology**, 1974, Cambridge, M.A.: MIT Press.
- [10] K. Waite & J. Rowley, “E-servicescapes in online banking: Towards an integrated conceptual model of the stimuli contributing to the online banking experience, 2014, In T. Harrison, & H. Estelami (Eds.), **The Routledge companion to financial services marketing**, Abingdon, Oxfordshire: Routledge, pp. 376–394.
- [11] L. Gamberini & A. Spagnolli, Towards a definition of symbiotic relations between humans and machines. In L. Gamberini, A. Spagnolli, G. Jacucci, B. Blankertz, & J. Freeman (Eds.), **International workshop on symbiotic interaction**, 2016, pp. 1–4, Cham: Springer.
- [12] V. Sundararaj & R.M. Rejeesh, “A detailed behavioral analysis on consumer and customer changing behavior with respect to social networking sites”, **Journal of Retailing and Consumer Services**, 2021, Vol. 58, 102190.
- [13] E. Kordrostami & V. Rahmani, “Investigating conflicting online review information: evidence from Amazon.com”, **Journal of Retailing Consumer Services**, 2020, Vol. 55, 102125.
- [14] S.F. Chou, J.S. Horong, C.H.S.Liu & J.Y. Lin, “Identifying the critical factors of customer behavior: an integration perspective of marketing strategy and components of attitudes”, **Journal of Retailing Consumer Services**, 2020, Vol. 55, 102113.
- [15] A.H. Busalim, F. Ghabban & Ab R.C. Hussin, “Customer engagement behavior on social commerce platforms: An empirical study”, **Technology in Society**, 2021, Vol. 64, 101437.
- [16] N. Hajli, “Social commerce constructs and consumer’s intention to buy”, **Int. J. Inf. Manag.**, 2015, Vol. 35 (2), pp.183–191.
- [17] Z. Huang & M. Benyoucef, “From e-commerce to social commerce: a close look at design features”, **Electron. Commer. Res.**, 2013, Vol. 12 (4), pp.246–259.
- [18] H. Zhang, Y. Lu, S. Gupta & L. Zhao, “What motivates customers to participate in social commerce? The impact of technological environments and virtual customer experiences”, **Inf. Manag.**, 2014, Vol. 51, pp.1017–1030.
- [19] T.P. Liang & E. Turban, “Introduction to the special issue social commerce: a research framework for social commerce”, **Int. J. Electron. Commer.**, 2011, Vol. 16 (2), pp. 5–14.
- [20] M. J. De Oliveira, M.K.Z. Huertas & Z. Lin, “Factors driving young users’ engagement with Facebook: evidence from Brazil”, **Comput. Hum. Behav.**, 2016, Vol. 54, pp.54–61.
- [21] C.Y. Li, “How social commerce constructs influence customers’ social shopping intention? An empirical study of a social commerce website”, **Technol. Forecast. Soc. Change**, 2019, Vol. 144, pp. 282-294.
- [22] S.S. Chen, B. Choukey & V. Singh, “A neural network-based price sensitive recommender model to predict customer choices based on price effect”, **Journal of Retailing and Consumer Services**, 2021, Vol. 61, 102573.
- [23] P. Rita, T. Oliveira & A. Farisa, “The impact of e-service quality and customer satisfaction on customer behavior in online shopping”, **Heliyon**5, 2019, e02690.
- [24] S.X. Chen, X.K.Wang, H.Y. Zhang & J.Q. Wang, “Customer purchase prediction from the perspective of imbalanced data: A machine learning framework based on factorization machine”, **Expert Systems With Applications**, 2021, Vol. 173, 114756.