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# The Effects of Pros and Cons of Applying Big Data Analytics to Enhance Consumers' Responses

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ARTICLE DETAILS	ABSTRACT
<p><b>Article History</b> <i>Published Online: Sep 2024</i></p> <hr/> <p><b>Keywords</b> Pros and Cons Big Data Analytics Consumer Response Big Data</p> <hr/> <p><b>JEL Codes:</b> <b>D83</b> <b>D91</b> <b>E21</b> <b>G40</b> <b>L19</b> <b>R20</b></p> <hr/> <p><b>Corresponding Author</b> <i>Email: camponsah@yorkvilleu.ca</i></p>	<p>When it concerns to the pros and cons of big data analytics, the recent discussion in Information Technology topic (IT) has been all about big data use in the business. The benefits of big data can support and assist the enterprises in streamlining their processes, improving efficiency, and saving costs. With the improvement of IT, more volumes of data are flowing into modern organizations. Data is now becoming larger and further complex as a result of the ongoing accumulation of information from several devices and platforms such as smartphones, personal computers, government documents, as well social networks. Most of the businesses in developed countries have embraced the emerging Big Data Analytics (BDA) paradigm which has increased the motivation of researchers and business professionals in a way to evaluate its ramifications for company objectives and challenges. However, there is a lack of research study that broadens the limited understanding the customer's perceptions and attitudes toward applications of big data analytics. The main goal of this study is to address the pros and cons of adopting BDA as it pertains to how customers behave in an e-commerce context.</p>

## 1. INTRODUCTION

With the growth of IT world, a rising volume of data is flowing into all different organizations and enterprises. As a result of continual accumulation of information from various devices and sources, the information is becoming more complicated (Ozturk, 2024; Sukkari, 2024). A research from the International Data Cooperation predicted by 2011, the world will produce 1.8 zettabytes of data. This number increases to nearly 35 zettabytes by 2020. The age of big data is arrived, and it is important for scholars and practitioners to understand the effects of big data analytics. This important issue may be covered simply by assumes the big data makes it possible to bring prospective applications. The applications for Big Data Analytics (BDA) may assist the companies to predict socioeconomic critical issues related the unemployment rate, encouraging economic growth, and presenting emerging outcomes for numerous benefits and other industries. In the field of medicine, BD could be used to predict the future development of some diseases. Google Flu Trend (GFT) is one of the most famous examples of BD in the healthcare area.

In order to evaluate and anticipate the tendencies that affect the H1N1 flu virus's propagation in 2009, the Google employed BD. The patterns that Google inferred from the H1N1-related search terms has been shown to be quite similar to the outcomes of the flu self-determining alert scheme Sentinel GP and Health Statistics launched. The GFT tool was created to track flu cases throughout the world using Google explorations that match phrases for flu-related activities (Kandula and Shaman, 2019).

With different definitions of BD, it causes a lot of buzz throughout the world. A BD is a large dataset that can be gathered, transmitted, consolidated, stored, and evaluated. BD is created from an increasing variability of sources, like internet clicks, dealings, user-generated material, and social media channels (Al kurdi, 2024; Al kurdi et al., 2024), also to deliberately content generation via sensor networks or business transactions like as customer data as well buying transactions. BD has various features (volume, variety, velocity, integrity, and value) that separate it from the typical categories of data applied in the big data analytics (Yin and Kaynak, 2015).

All businesses and projects have recently moved earlier to comprehending the world of Big Data by looking at how it is used to solve the emerging problems (Mohammadpoor and Torabi, 2020). The most industries are currently evaluating the advantages of using big data analytics. Big Data applications have been demonstrated in the top ten industries, including banking, financial securities, communications, social media and entertaining, healthcare workers, industrial, government, insurance, wholesale, retail trade, transportation etc. Despite the fact that Big Data faces unique challenges, industries in these areas have effectively used it (Aceto et al., 2020).

Retailing and wholesaling are important aspects of the economy and daily lives. Consumer and corporate markets acquire products and services on a regular basis depend on their changing requirements and preferences. The wholesale and retail sectors provide important contributions to the state's economy. In today's complex and competitive business environment, the organisations must depend on data-structured as well new types of data-unstructured or semi-structured-to drive their major decisions. BDA can assist e-vendors through enhancing market transactions cost efficiency, management transactions cost efficiency, and time savings. BD, in particular, allows the companies in e-commerce domain to follow individual users' behaviour and discover the most operative ways to make regular customers. Incorporating BDA in a company's value chain (Tosello et al., 2019) leads in a 5-6% productivity among the competitors. The recent research has concentrated on the good processes of using BD analytics, through lower attention paid to the negative effects of BD such as privacy and security, purchasing addictions, and social influences. Though, the benefits and drawbacks of using big data analytics to evaluate the client replies have not been highlighted.

Before 2008, three consumer behaviour models were found, and it was determined that consumers wanted to buy more products. Customers delayed to purchase things in 2008 as a result of the global financial and economic crisis. As a result, customers made fewer purchase, and they developed a protective attitude. Customers nowadays have enforced to cope with a plethora of data. As a result, their behaviors and attitudes have become unpredictable and the potential cost for the decision-making procedure is more complex. Understanding consumer behavior demands a new approach, and big data analytics may be a method in this way. The possessions of BDA on company values and business challenges have been documented in several earlier studies. However, there is a lack of study on what customers believe around the using big data analytics for online purchases. Research on consumers' perceptions of the advantages and disadvantages of using BDA is therefore developing into a cutting-edge marketing strategy (Zia, 2022).

The attention, interests, and action stages of a customer's response are measured using the AIDA model from a marketing viewpoint. The four stages an e-vendor puts their consumers when buying are illustrated by the AIDA model. This model demonstrates how customers move from attention to intrigue to want to action. E-vendors need to capture the consumer loyalty before piquing their interest in the item or service. A deep desire to influence service utilization should result from that desire. The AIDA model's action shows the consumer making a purchase and complete the transactions. This research examines customer responses in two stages, using the AIDA model as its foundation: Objectivity and Action (Le and Liaw, 2017).

## 2. LITERATURE REVIEW

Many scholars have focused on big data analytics to enhance the business sector by analyzing customer behavior. This section highlights some of these works. According to Le and Liaw (2017), e-vendors employ BDA to provide modified offers, set pricing structure, and provide the best channel to bring customers value. The use of BDA to provide a virtual buying experience, in addition to a more direct human encounter of tailored products, will improve customer propensity to buy.

According to the authors, the benefits of using BDA include delivering information search, personalized sanction, dynamic pricing, and customer service to connect among community members. The companies may achieve demand direction, preference alignment, relationship orientation, as well as other approaches to please customers by collecting various data in the Big Data age, like geographic range, emotional tendencies, as well social communication and hobbies. E-commerce vendors employed ICT to deliver tailored services to clients and reshape the website and deliver better services (Astudillo et al., 2014). To add more, Maroufkhani et al. (2019) claimed that studying social media data is important for understanding customers' behaviors in e-commerce platforms. Furthermore, numerous e-commerce firms leverage social media data to build communicating relationships with their customers and provide real-time promotions.

According to the researchers of this study, big data presents opportunities for firms that can use it to make value. The goal is to get value from quantities and different types of data by allowing processing velocity. The 5 Vs concept is for volume, velocity, diversity, value, and veracity (Demchenko et al., 2013). Volume entails processing vast amounts of data from any source. Data volume growth enhances information exchange and public awareness.

In order to benefit from big data analytics, many firms have started implementing big data applications in the management of their company operations. Big data processing creates value that helps in making the best choice. In order for businesses to benefit from big data analytics, information must be refined and processed. By recording, examining, or analyzing each infant's heartbeat for example, big data analytics can help disclose the circumstances and save the life of a newborn baby. The indications of the infant are finalized with the use of data analytics. The enhancement of machine or device efficiency is one of the uses for big data. For instance, the Toyota Prius is equipped with cameras, GPS, high-tech processors, and sensors to automatically ensure road safety (Anshari et al., 2019).

Application of analytical, processing, and analytics methods to big data for business improvement is known as BDA. To meet specific client needs for gaining and maintaining a competitive edge, BDA is becoming increasingly important. Businesses are implementing analytics initiatives to forecast customers' propensity to purchase specific innovative brands in order to: (1) improve and more personally tailor recommendations for future items purchased or offer a discount; (2) identify the causes of failures, hurdles, and defects in close to real-time; or even predict and regenerate failures before they happen; (3) analyze online consumer feedback or contact center data to learn about consumers' experiences with products or services in order to enhance quality and incorporate fresh items; (4) provide quick reactions for emergency situations and improve anomaly detection; (5) modify internal procedures, identify operational major obstacles inside an organization, and so on. Analytics of structured and unstructured data sources can provide responses to inquiries that firms had not even thought to ask. BDA may be the business development that has the most potential to influence current IT investments over the previous 10 years (Grover et al., 2018).

The benefits of analysis of big data from social networks is one of the most important tools for guiding the transition towards sustainable knowledge management for marketing trends in particular, if take into consideration that social networks are means of knowledge, through which knowledge is created, exchanged, and extracted (Liaw & Le, 2017). It can also discover hidden patterns, trends, and correlations in large datasets that provide valuable insight; predict the right marketing decisions for the benefit of organizations. Accordingly, the practice in this regard becomes more sustainable, as it not only

aims to achieve the short-term goals of the organizations, but also takes into account the achievement of long-term goals, which is the essence of the concept of business sustainability (Samsudin et al., 2022).

The success of modern marketing trends requires obtaining a large amount of digital data and information, especially those available on social networks, as they constitute updated and inconclusive sources of big data. The competition through its analysis has become a source of enabling sustainable knowledge management of market trends and customers expectation analysis (Le et al., 2020).

### 1. PROBLEM STATEMENT AND RESEARCH CONTRIBUTION

Today there are a lot of issues faced regarding big data analytics in business sector in terms of consumer response, this research highlights different pros and cons of BDA such as deficiency of alignment within teams, deficiency of alignment among diverse teams or departments within an organization, deficiency of promise and patience, low quality of data, privacy anxieties and complexity & Bias. So, our proposed model could address these issues by using the longitudinal approach for better results generation. Analyzing big data from different sources like social networks in order to support marketing trends and understand consumers' responses is the analysis conducted by the organization of huge amount of random data that is mined and extracted from these different sources to reach knowledge that supports making effective marketing decisions; and enable the organizations to manage sustainable marketing knowledge.

### 2. PROPOSED FRAMEWORK FOR CUSTOMER RELATIONSHIP MANAGEMENT

The main aim of this research is to provide a further discussion and insights of how could big data enhance the factor of consumers' responses and relationship management from a holistic perspective. The most suitable process for conceptualizing the Customer Relationship Management (CRM) phenomenon is proposed to provide convenient insights in purifying the nature of the CRM perspectives, and in describing its inputs and outputs (Alshurideh, 2024; Alshurideh et al., 2023). CRM's objective is to make the best use of limited capitals to develop a profitable portfolio of customer relationships (Nuseir et al., 2023; Alshurideh, 2022). The proposed aspects of CRM are shown in Figure (1).

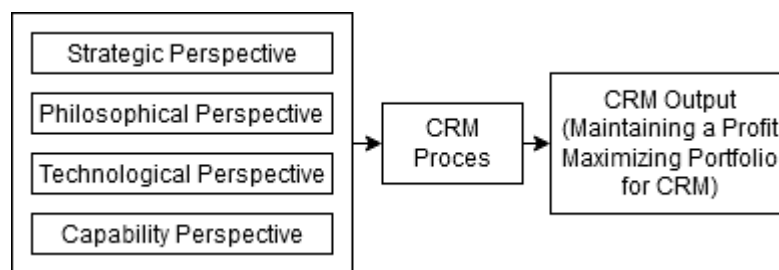


Figure (1) Proposed aspects of CRM perspectives

Figure (1) is showing that the CRM output is dependent on five perspectives and each of the perspective is described in detail in below:

**Strategic perspective:** The strategic approach aims to direct CRM toward better organisational profitability by considering both customer wants and company competencies into consideration. The allocation of resources for connection creation and maintenance must be consistent with the lifetime value of the client and the kind of client, which may also lead to the decision not to form any kind of connection.

**Philosophical perspective:** According to the philosophical viewpoint, one of the critical organisational assets for CRM is customer focus. Organizational change is inevitable in CRM projects, and it includes the introduction of new systems and procedures, as well as behavioural changes in personnel, company-wide cross-functional Business Process Reengineering (BPR), and organisational structure changes.

**Technological perspective:** CRM implementations, from the technology perspective, are an essential element to the CRM process for enhancing the creation, distribution, and use of customer data across multiple points. Furthermore, CRM success appears to be heavily driven by the synchronization of technology, procedures and workers.

**Capability perspective:** According to the capability perspective, the organisations must have a set of collaborative resources, i.e., capabilities that enable them to create and act on customer data and prospects. As a result, Knowledge Management (KM) is defined as a set of actions for producing and using market intelligence in order to construct and manage a profit-maximizing portfolio of client connections as a primary sub-process of the CRM macro-process.

### 3. CRITICAL ANALYSIS AND DISCUSSION

Today, the use of big data knowledge may improve the customer experience in a number of ways, such as lowering the number of calls to customer service, improving marketing targeted, and raising customer satisfaction. The customer experience and big data are significantly influencing businesses while having a tremendous impact on organizations worldwide. While using a data-driven approach for marketing may provide help in smart selling. In the digital marketing industries have a website or app for clients to connect business is no longer sufficient. Customers need a seamless, personalized experience that is catered to their needs and delivers the relevant information through the proper channels at the proper time. In this research, the critical analysis is done on the multiple pros and cons while applying big data reported by multiple enterprises, as shown in Tables (1) and (2), respectively.

Table (1) Positive aspects.

Positive aspects	
Better decision-making	Better decision-making is a vital goal of big data analytics efforts. Some analytics have started to work while providing the business with better decision-makers, providing the data-driven insights they require to assist their companies compete and produce.
Increased productivity	Businesses are using big data tools like Hadoop and Spark to improve productivity. Modern big data solutions are enhancing analysts' personal efficiency by allowing them to examine more data more quickly. Additionally, the knowledge gained from such analytics frequently enables organisations to boost productivity more extensively across the range.
Reduce costs	Interestingly, respondents selected cost decline as their main objective for big data analytics.
Improved customer service	Business sectors' most common goals are to improve customer service with big data analytics initiatives, which have succeeded in this endeavour. Today's organizations have a huge amount of information about their consumers due to social media, Customer Relationship Management (CRM) schemes, and other client interaction points. It is only reasonable that they would employ this information to help those people.
Fraud detection	Fraud detection is another common application of BDA in the business of financial services. Customer is used in big data since it can identify patterns and anomalies. These capabilities may enable the bank and credit card firms to detect stolen cards or fraudulent transactions earlier the cardholder is even conscious that something has gone wrong (Muhammad & Fatima, 2022).
Increased revenue	Companies frequently use big data to enhance decision-making and customer service, and a natural consequence of this is often more revenue.
Increased agility	In addition to employing analytics to enable faster and more regular changes to their plans and tactics, many businesses are using big data to improve align their IT mobility and business operations.
Greater innovation	Another mutual benefit of BDA is creation, which primarily means inventing and upsetting their markets. They believe that if they can get insights that other competitors do not, they might well be able to gain an advantage over their competitors with novel products and services.



Table (2) Negative aspects.

<b>Negative aspects</b>	
Need for talent	The highest paid IT professionals are big data experts and data scientists. For the last three years, the biggest concern has been the lack of big data specific skills. According to users, rated skills and the personnel are the second most challenge when building a data lake. The costs associated with recruiting or training new employees might increase sharply, and it can take some time to become proficient in big data.
Data quality	Another negative aspect of working with big data is addressing data quality concerns. Data scientists and analysts must ensure the data they are utilizing is reliable for analysis before being able to employ big data for analytics initiatives. That considerably slows the reporting, but if the companies don't address issues with data quality, they might find the insights their analytics provide meaningless if used.
Need for cultural change	Many businesses that use big data analytics want to go beyond simply improve reporting; they desire to employ analytics to instill a data-driven culture across the whole company.
Compliance	Adhering to legal requirements is another issue with big data analytics projects. Big data repositories sometimes include sensitive or private information, thus it may be necessary for the company to make sure that they adhere to regulatory or industry regulations while processing and storing the data.
Cybersecurity risks	Companies that store sensitive data may become more appealing targets for cyber attackers. Security has frequently been listed as one of the top big data challenges, and CEOs regarded data breaches as that of the single worst data acquired their companies face.
Rapid change	Another potential difficulty of big data analytics is that technology is evolving rapidly. An organization will likely invest in a particular technology only to see very high growth after a few months. Respondents ranked this big data problem as the most challenging problem they face.
Hardware needs	Another problem in enabling big data analytics endeavors is IT infrastructure. The storage space necessary to keep the data, the networking bandwidth needed to send it to and from analytics systems, and the computer resources needed to do the analytics are all expensive to buy and maintain. Some firms can deal with this problem via cloud-based analytics, however this does not always remove infrastructure issues.

The purpose of this research is to discuss the factors of employing BDA and how they affect consumers' responses in Business 2 Customer (B2C) e-commerce settings using BDA. The first finding revealed that information seeking, recommendation systems, price optimization, and customer support had a significant favorable influence on consumers' responses. The customers' responses were shown to be highly affected by factors such as security and privacy shopping addictions, and societal factors. The previous research has discovered that decision making effects the recommender systems, information search, reputation scheme, and virtual experiences of online consumers in the Big Data environment. In the Big Data era, data privacy and security are inherent issues. The research aims to address numerous issues that may assist in the creation of marketing techniques for e-commerce in the Big Data era. The recommendation system enables the customers to simply identify and match their interests and preferences, enhancing customer behavioural intention.

It is necessary to understand the market conditions. By analyzing big data, the organizations can get a better understanding of the current market conditions, for example, by analyzing customers' purchasing behaviors, the company can find out which products are best-selling and produce products according to the trend. Online data control Big data techniques and tools can perform analysis through the internet so, the company also can get feedback on who says what about company, if it wants to monitor and improve the online presence of the business then big data tools can help with all this.

Through the above discussions, the customer is the most important asset in any business. No single business can claim success without first having to build a solid customer base. However, even with a strong customer base, companies can't afford the high competition they face. If a business is slow in knowing what customers are looking for, it is very easy to start offering poor quality products in the end,

loss of customers will result, and this creates an overall negative impact on business success. Customer behavior is important to generating loyalty.

#### 4. CONCLUSION, LIMITATIONS AND FUTURE DIRECTIONS

According to this study, using BDA has emerged as the new invention and approach of the e-commerce sector. Using dynamic processes, and technology to analyse data to tailor consumers' needs, BDA is rapidly providing positive value to clients. Google, eBay, Amazon, Taobao, and other leading e-commerce companies that use BDA have already applied and generated significant revenue. However, using BDA has certain adverse implications for consumer responses. This study presents various good and negative elements, as well as their effects on client responses for the use of BDA. In the Big Data age, the research shows that methods for data analysis compete the needs beyond 2017. As a result, in order to survive in dynamic and digitally scanned marketplaces, companies must start adapting to the trend by using BDA. This is the process of using data, sources, abilities, and systems to get a competitive advantage. Big data is a notion that has been invented and is now being used to improve strategies, prediction, and decisions for better customer connections. However, there are benefits and drawbacks to using BDA. E-vendors can maximize the value of using BDA but should avoid over-reliance on BDA to prevent negative consequences. Validation by using actual examples would result in appropriate and efficient marketing tactics.

In the most developed countries, the age of Big Data analytics has started. This new analytics platform has attracted the attention of professionals and researchers who want to explore its consequences for business values and challenges. However, research that help to understand customers' behaviors regarding Big Data analytics applications are rare. The purpose of this research is to investigate and evaluate the advantages and disadvantages of using Big Data analytics to impact client responses in an e-commerce context. The limitations of this study and future research may be summarized in three ways. First, future research may incorporate samples from a diverse demographic community because the sampling of prospective consumers in this study is limited. Researchers also recognized that the study's survey participants were Vietnamese, which would be a restriction. However, the study's offer is useful and pertinent to emerging nations such as Vietnam. Further research could include a cross-cultural comparison of various nations. Second, as a dependent variable, the present study used users' evaluations of their reaction. Even while users' perspectives are frequently used as a proxy for action, they do not correctly anticipate actual purchasing situations. As a result, the current study's findings must be interpreted and applied with care. Similar future studies should evaluate actual online buying behavior as a dependent variable, such as information search, real-time record ordering, and purchase amount. Third, a continuous strategy is suggested for a future study in order to explore other effects of using BDA and record changes in consumer responses.

#### References

- Aceto, G., Persico, V., & Pescapé, A. (2020). Industry 4.0 and health: Internet of things, big data, and cloud computing for healthcare 4.0. *Journal of Industrial Information Integration*, 18, 1–14.
- Al Kurdi, B. (2024). Social Media Addiction: Youths' Perspectives, *International Journal of Management and Marketing Intelligence*, 1(1), 1-10.
- Al Kurdi, B., Alshurideh, M. T., Hamadneh, S., Kalra, D., Marwaha, S., & Alzoubi, H. M. (2024, February). Machine Learning Applications in Social Media Marketing: Innovating Customer Engagement and Brand Building. In *2024 2nd International Conference on Cyber Resilience (ICCR)* (pp. 1-7). IEEE.
- Alshurideh, M. (2024). Utilize Internet of Things (IOTs) on Customer Relationship Marketing (CRM): An Empirical Study, *International Journal of Management and Marketing Intelligence*, 1(1), 11-19.
- Alshurideh, M., Kurdi, B., Alhamad, A., Hamadneh, S., Alzoubi, H., & Ahmad, A. (2023). Does social customer relationship management (SCRM) affect customers' happiness and retention? A service perspective. *Uncertain Supply Chain Management*, 11(1), 277-288.

- Anshari, M., Almunawar, M. N., Lim, S. A., & Al-Mudimigh, A. (2019). Customer relationship management and big data enabled: Personalization & customization of services. *Applied Computing and Informatics*, 15(2), 94-101.
- Astudillo, C., Bardeen, M., & Cerpa, N. (2014). Data mining in electronic commerce-support vs. confidence. *Journal of theoretical and applied electronic commerce research*, 9(1), i-vii.
- Demchenko, Y., Ngo, C., Membrey, P., 2013. Yuri, D., Canh, N., & Peter, M. (2013). Architecture framework and components for the big data ecosystem. *J. Syst. Netw. Eng.*, 1-31.
- Muhammad, N. A., & Fatima, R. (2022). Role of image processing in digital forensics and cybercrime detection. *International Journal of Computational and Innovative Sciences*, 1(1), 39-42.
- Grover, V., Chiang, R. H., Liang, T. P., & Zhang, D. (2018). Creating strategic business value from big data analytics: A research framework. *Journal of management information systems*, 35(2), 388-423.
- Kandula, S., & Shaman, J. (2019). Reappraising the utility of Google flu trends. *PLoS computational biology*, 15(8), 1–16.
- Le, T. M., & Liaw, S. Y. (2017). Effects of pros and cons of applying big data analytics to consumers' responses in an e-commerce context. *Sustainability*, 9(5), 1-19.
- LE, T., Liaw, S. Y., & Bui, M. T. (2020). The Role of Perceived Risk and Trust Propensity in The Relationship Between Negative Perceptions of Applying Big Data Analytics and Consumers' Responses. *WSEAS Transactions on Business and Economics*, 17, 425-434.
- Liaw, S. Y., & Le, T. M. (2017). Comparing mediation effect of functional and emotional value in the relationship between pros of applying big data analytics and consumers' responses. *International Journal of Marketing Studies*, 9(4), 66-75.
- Maroufkhani, P., Wagner, R., Wan Ismail, W. K., Baroto, M. B., & Nourani, M. (2019). Big data analytics and firm performance: A systematic review. *Information*, 10(7), 1–21.
- Mohammadpoor, M., & Torabi, F. (2020). Big Data analytics in oil and gas industry: An emerging trend. *Petroleum*, 6(4), 321-328.
- Nuseir, M. T., Aljumah, A. I., Urabi, S., Alshurideh, M., & Al Kurdi, B. (2023). The Impacts of Social Media on Managing Customer Relationships with Brands in the UK. In *The Effect of Information Technology on Business and Marketing Intelligence Systems* (pp. 65-88). Cham: Springer International Publishing.
- Ozturk, I. (2024). Factors Influencing the Use of the Internet of Things (IoT) to Enhance Customer Relations and Customer Experience, *International Journal of Management and Marketing Intelligence*, 1(2), 1-9.
- Samsudin, S. N., Abdullah, B., & Yusoff, N. (2022, June). Customer Satisfaction and Service Experience in Big Data Analytics for Automotive Service Advisor. In *2022 IEEE International Conference on Automatic Control and Intelligent Systems (I2CACIS)* (pp. 84-89). IEEE.
- Sukkari, L. (2024). The Impact of Big Data Analytics on Customers' Online Buying, *International Journal of Management and Marketing Intelligence*, 1(2), 10-19.
- Tosello, G., Charalambis, A., Kerbache, L., Mischkot, M., Pedersen, D. B., Calaon, M., & Hansen, H. N. (2019). Value chain and production cost optimization by integrating additive manufacturing in injection molding process chain. *The International Journal of Advanced Manufacturing Technology*, 100, 783-795.
- Yin, S., & Kaynak, O. (2015). Big data for modern industry: challenges and trends [point of view]. *Proceedings of the IEEE*, 103(2), 143-146.
- Zia, G. (2022). Evaluation of Customer Satisfaction Based On Food Quality By Using Fuzzy Inference System. *Journal of NCBAE*, 1(1), 30–38.