



## Consumer Attitude towards 'Online Food Ordering': An Empirical Study

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**Abstract.** A new channel for marketing has emerged in the age of mobile applications. All conventional company practises have been rendered obsolete by mobile applications, which have also opened up incredible new business opportunities. A mobile app combines technology and marketing knowledge, using the internet as a platform to advertise and market goods and services. More and more people are now prepared to transact through mobile applications and are linked via them. Additionally, it has an impact on how businesses and organisations run. To accommodate the demands and preferences of customers at any given time, businesses have switched from traditional commercial techniques to internet marketing. The main reasons customers (users) order online are convenience and control. Online ordering is also linked to higher income, better capacity management, increased productivity, and improved transactional marketing and customer relationship management. This research paper's goal is to discuss how Chennai residents feel about online meal ordering and delivery services. The aim goal of the study was to analyse the responses of 118 participants. The investigation and analysis of data gathered from all users of existing online meal delivery services are the main foci of the research. The goal is to understand the driving forces, their needs, how various qualities of various online portals are positioned in their minds, and how satisfied they are overall with online meal delivery services. **Methodology:** The major goal of this study is to determine which online meal delivery services—Pizza Hut, KFC, Domino's, Swiggy, and Zomato—are preferred by male and female consumers. In order to gather a sample from the 118 respondents, the researcher employed descriptive research and a convenience sampling technique. The MCDM ARAS methodology was used to test both variables and items. Swiggy is ranked first, and Domino's Limits is ranked bottom. the Swiggy is in first rank and Dominos Limits are last rank.

**Keywords:** Food Ordering, MCDM ARAS method

### 1. Introduction

The hospitality industry in India is essential to the service sector because it has become one of the country's most important sectors in the twenty-first century. The hospitality sector has long catered to the wants and preferences of people. Customer happiness and trust are frequently seen as the most important factors in the hospitality sector, which depends on the company's goods and services living up to consumers' expectations. The food market in India was estimated to be worth about INR 23 trillion in 2015 by Boston Consulting Group, and it is projected to grow to INR 42 lakh crore by 2020. Technology has a significant impact on how food services are delivered. Because of their reliance on technology, clients now use online food delivery services to personalise food to suit their tastes and have it delivered with only a few clicks on mobile devices. Customers benefit from online meal delivery services in terms of convenience, time savings, and effort savings, which are good enough reasons to employ these services. Based on what customers are expecting from these services, the delivery of meals to clients has expanded, as have the services themselves. Finding restaurants serving desired cuisines is made easier by services. The utilities service displays the whole menu, and customers can select items by clicking on them. The functionality and customer value systems offered by these app services vary. This research report intends to investigate and evaluate consumer perceptions of Chennai-based Zomato, Swiggy, Pizza Hut, KFC, and Domino's users.

The recent growth of the Internet has made online ordering and purchasing of food services commonplace, particularly for owners of Android mobile phones. Customers are increasingly comfortable using internet services. The development of technology has had a significant impact on people's lifestyles because it now allows them to buy goods and services online, accessible 24/7. These facilities speed up customer service, decrease human error, use less staff, and boost customer happiness. One of the most competitive markets in India is food delivery. With the introduction of smartphone apps and online food delivery services, businesses are suddenly awake and aware. Most people today use mobile applications and are prepared to transact business via them. Depending on the tastes and wants of the customer at any given time, even firms have switched from employing traditional commercial strategies to internet marketing. The Android app allows users to register on apps, select meals from a menu card, and place food orders. To control India's fiercely competitive food delivery market, Joma du Bengaluru is in a fierce fight with Bangalore-based Zwiggy. Pizza Hut, KFC, Domino's, Swiggy, and Zomato are further significant market participants. Order tracking, one-step registration, secure payment options, GPS-assisted restaurant or hotel search, table reservations, and safe payment methods are the main advantages of ordering food through a food app. The biggest disadvantage is that orders cannot be modified once they have been sent. The app was cancelled because it needs an internet connection to operate. Trending in the online food market are the most popular meals, favourite international cuisines, favourite Indian starters, greatest breakfast, lunch, and dinner products, desserts, early and latest orders, pricey and

inexpensive orders, and many more. Restaurants can accept online orders through their own website or app, through the websites or apps of other restaurants (such as Pizza Hut, KFC, Domino's, Swiggy, and Zomato), by text messages, or via Facebook. The main reasons customers (users) order online are convenience and control. Online ordering is also linked to higher income, better capacity management, increased productivity, and improved transactional marketing and customer relationship management. Restaurants can accept online orders through their own website or app, through the websites or apps of other restaurants (such as Pizza Hut, KFC, Domino's, Swiggy, and Zomato), by text messages, or via Facebook. The main reasons customers (users) order online are convenience and control. Online ordering is also linked to higher income, better capacity management, increased productivity, and improved transactional marketing and customer relationship management. Order accuracy is the key component of online ordering. The ease and convenience of ordering followed next. Despite the availability of Internet and telephone applications, telephone calls remain the most popular ordering method (53.7 percent). However, people are increasingly ordering food online, with more than 38% of orders coming from a restaurant's website or app.

The Indian e-commerce market has been expanding quite quickly in recent years and up to now. The way people think, seek, act, and produce is changing as a result of e-unrelenting commerce's expansion. The majority of consumers use modern technology when they purchase, and many of them are liberal thinkers who favour quick and easy purchasing while taking other factors into account. The majority of small, medium, and large businesses have websites to advertise their brands, and they "digitalize" their business cycles by leveraging online marketing and promotional activities. Consumer convenience, demands, tastes, and buying behaviours and processes are what fuel the ongoing expansion of e-commerce. One of the most common online activities is food shopping, yet the motivations behind consumers' e-purchasing are still a mystery. The current study aims to record customers' online shopping behaviour, examine consumers' preferences and views of online shopping, and weigh pros and negatives. This study will provide company managers with a wealth of information that they may use to restructure the retail market for food and other associated goods with a working class focus.

## 2. Material and Methods

Deepinder Goyal and Pankaj Chaddah founded Zomato in 2008 in India. It is a restaurant search and discovery tool that offers clients restaurant locations, menus, pictures of the food, and reviews from past patrons. Initially, the services were launched under the name Foodiebay, but in November 2010, Zomato was chosen as the company's brand name. Zomato has achieved great success and is currently available in 24 different nations. The founders of the meal delivery service Swiggy are Bangalore natives Nandan Reddy, Rahul Jaimini, and Sriharsha Majety. The business was founded in 2014 and is run by Bundl Technologies Private Limited. It is valued at \$1.3 billion, and it has received about \$465.5 million in capital overall. In the middle of the 1960s, KFC opened locations in Canada, the United Kingdom, Mexico, and Jamaica, becoming one of the first fast food companies to go global. KFC had a mixed record domestically during the 1970s and 1980s due to a succession of corporate ownership changes made by individuals with little to no prior knowledge of the restaurant industry. Early in the 1970s, the chain quickly grew in China, which is currently the company's biggest market. Sanders' 11 herbs and spices are used to season pressure-fried chicken pieces, which are the company's initial product. The recipe's ingredients are a crucial trade secret. Domino's Pizza, which contends that consumers eat pizza in order to taste the real thing, is the main rival of Pizza Hut. In light of this viewpoint, Domino's has tried regional cuisines in the past, such as Chettinad Chicken, but thought that they could not sustain themselves over the long term due to their novelty value. Pizzas like the cheese explosion or the three cheese (only manufactured for India) that are exotic but still have global appeal are Domino's response to innovation. Pizza Hut prefers to concentrate solely on pizzas, in contrast to Domino's Pizza. It serves a variety of drinks, pasta, and snacks. Its plan to transition from a quick service restaurant (QSR) to a casual dining establishment includes this. The concept includes a few locations introducing wine and beer. Additionally, this tactic sets them apart from Domino's, a rival whose primary competitive advantage is home delivery (Kicha, 2011). One of the most popular MCDM techniques in decision theory is ARAS, which is also one of the easiest ways to compare options based on predetermined criteria. Each piece of information is one dimensional. Or ARAS is only effective when in a unit. Among the MCDM techniques, ARAS by itself cannot be applied to multidimensional issues. All quantities have various units when a quantity is multidimensional. There are various ways to solve a one-dimensional problem outside using ARAS. However, the ARAS approach was created using a unique technique with the intention of handling multidimensional problems. Only numerical data are compatible with the weighted scoring system. Consequently, before determining the final score, each substitution Each evaluation criteria should be used as a benchmark. Aside from user satisfaction and optimization requirements, no additional criteria for component selection will be directly evaluated. As a result, all options that are pertinent to each assessment criterion take into account the user needs of the software components are assessed first. If all units are the same in one-dimensional scenarios, ARAS can be used with ease. The complexity of this strategy becomes clear when used to solve multidimensional MCDM problems. To get around this issue, the ARAS was created. The key difference between it and ARAS is that the model uses multiplication rather than addition. ARAS can be used to resolve both one- and multidimensional MCDM issues. This is a benefit of the strategy since relative values can be used in place of actual values. It has examined the issue of improving the performance of the new system by analysing the decision-making issues arising from the evaluation and selection of market segments in accordance with preset criteria. The weighted sum model (ARAS) approach is one of the decision support system methods that can be used to simplify this. The application of the weighted sum sampling method is a fairly straightforward process that only requires a few steps to produce results for section evaluation and exam results. Using a decision support system method, such as the weighted sum model (ARAS) method, can make this simpler. Weighted sum sampling application is a fairly straightforward process with only a few steps that can provide section evaluation and exam outcome results.

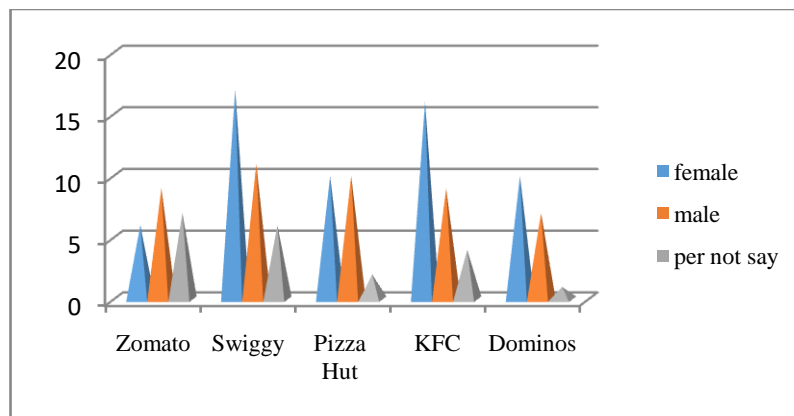
### 3. Results and Discussions

The ranking is the process of arranging information from smallest to greatest and vice versa. Consumer preferences are taken into account when ranking them. Explain how the respondents' preferences for Zomato, Swiggy, Pizza Hut, KFC, and Domino's ranked the various food ordering apps in this table to determine the maximum frequency of the mean value of the rank analysis.

**TABLE 1.** Online Food Ordering

	Female	Male	Per not say
<b>Zomato</b>	6	9	7
<b>Swiggy</b>	17	11	6
<b>Pizza Hut</b>	10	10	2
<b>KFC</b>	16	9	4
<b>Dominos</b>	10	7	1

Table 3 is given for the data set. This is for hundreds of values that the supplier works with, all supplier Dominos values are the lowest and Swiggy values are the highest. Therefore, as per not say values are very low and Female is very high, as seen in Figure 1.



**Figure 1** graph of 'Online Food Ordering

Figure 1 shows the customer preference selection of Pizza Hut, KFC, Domino's, Swiggy and Zomato Figure 1 shows the customer's preference selection of Pizza Hut, KFC, Domino's, Swiggy and Zomato, data set taken.

**TABLE 2.** maximum value

	Female	Male	Per not say
<b>Max</b>	17	11	7
<b>Zomato</b>	6	9	7
<b>Swiggy</b>	17	11	6
<b>Pizza Hut</b>	10	10	2
<b>KFC</b>	16	9	4
<b>Dominos</b>	10	7	1

Table 4 shows the data set's greatest value. Zomato for the most value per not say, Swiggy for the highest value for female, and Swiggy for the highest value for male.

**TABLE 3.** Normalized for data set

	Female	Male	Per not say
<b>Max</b>	0.223684	0.192982	0.259259
<b>Zomato</b>	0.078947	0.157895	0.259259
<b>Swiggy</b>	0.223684	0.192982	0.222222
<b>Pizza Hut</b>	0.131579	0.175439	0.074074
<b>KFC</b>	0.210526	0.157895	0.148148
<b>Dominos</b>	0.131579	0.122807	0.037037

Table 3 Data for analysis are transformed into normalized data. In which all values are less than 1. This makes the analysis easier.

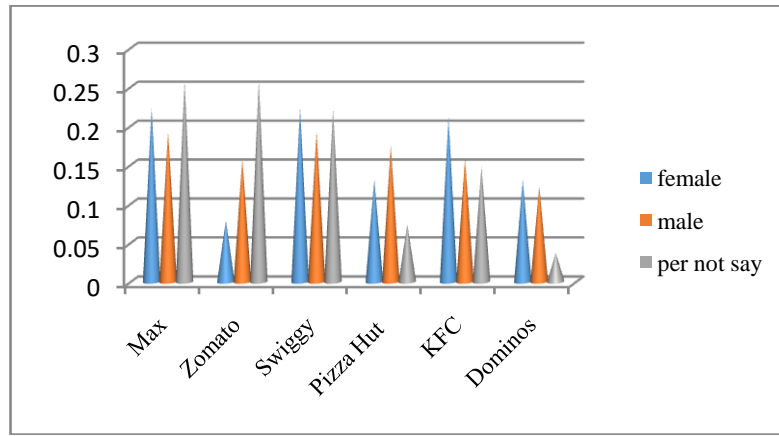


FIGURE 2. normalized data

Figure 2 shows the normalized customer preference selection of Pizza Hut, KFC, Domino's, Swiggy and Zomato data set.

Table 4 Weighted Normalized Matrix

	Female	Male	Per not say
<b>Max</b>	0.223684	0.192982	0.259259
<b>Zomato</b>	0.078947	0.157895	0.259259
<b>Swiggy</b>	0.223684	0.192982	0.222222
<b>Pizza Hut</b>	0.131579	0.175439	0.074074
<b>KFC</b>	0.210526	0.157895	0.148148
<b>Dominos</b>	0.131579	0.122807	0.037037

Weighted Normalized Matrix is obtained in Table 4. With this we can get sum of value. A weight age value of 0.25 is taken for all the data to get the weighted normalized matrix.

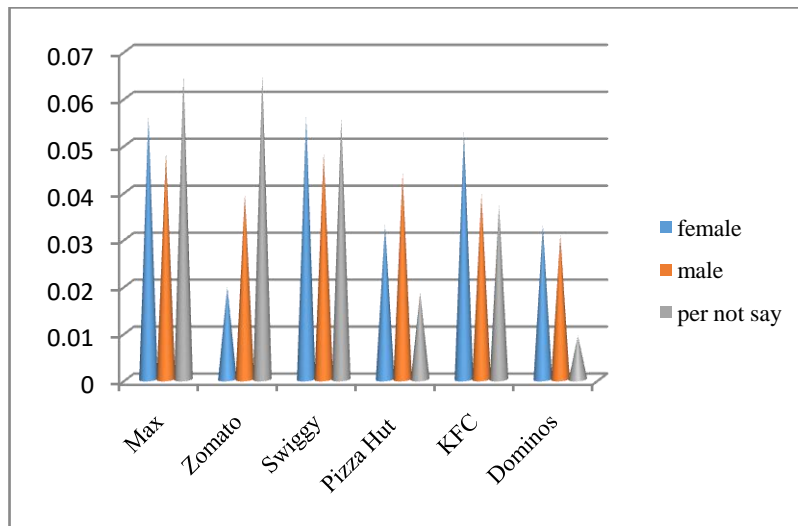


FIGURE 3. Weighted Normalized Matrix

Figure 3 shows the weighted normalized matrix, and the swiggy to say this graph has all the values in close proximity.

Table 5 Si and Ki value

	Si	Ki
<b>Max</b>	0.168981	1
<b>Zomato</b>	0.124025	0.733958
<b>Swiggy</b>	0.159722	0.945205
<b>Pizza Hut</b>	0.095273	0.563807
<b>KFC</b>	0.129142	0.764239
<b>Dominos</b>	0.072856	0.431146

From table 7 sum of value is obtained and Ki value is obtained. Ki value is obtained by dividing Si Max value. This can be seen in Figure 4.

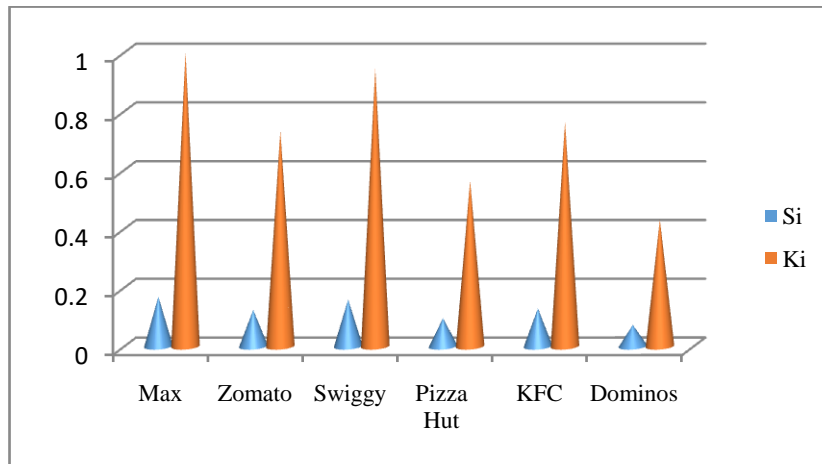


FIGURE 4. graph for Si and Ki value

TABLE 6. ranking

Zomato	3
Swiggy	1
Pizza Hut	4
KFC	2
Dominos	5

Table 8 reveals that Swiggy is in first place, followed by KFC in second, Zomato in third, Pizza Hut in fourth, and Domino's Limits in last place.

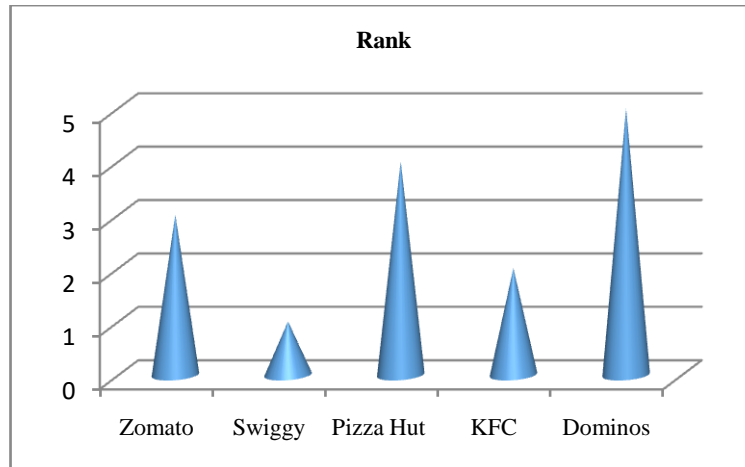


Figure 5 ranking

Figure 5 is showing Swiggy is in 1st rank, KFC is in 2nd rank, Zomato is in 3rd rank, Pizza Hut is in 4th rank and Dominos Limits are the last rank.

#### 4. Conclusion

Since individuals don't have enough time to order meals anymore due to a fast-paced lifestyle, online food ordering apps are gaining popularity in India. Online food ordering has become more popular among customers and business owners alike in the digital age, when the internet has become a valuable resource. One of the most common online activities is food shopping, yet the motivations behind consumers' e-purchasing are still a mystery. The current study aims to record customers' online shopping behaviour, examine consumers' preferences and views of online shopping, and weigh pros and negatives. Consumers have access to online meal ordering. Customers can enjoy a unique experience that can make buying meals online more trendy, pleasurable, and simple as they use it. The aforementioned study amply illustrates the variety of alternatives that online food ordering presents when acquiring any good or service. Ordering meals online through Swiggy was prioritised by

both customers, whereas enjoying food and other activities had lower rankings. The graph makes evident the attitude that online shoppers have when making purchases. For ordering meals, Swiggy is preferred by the majority of responders.

### Reference

- [1]. Somasundaram, T., V. G. Jisha, R. Rupashree, and A. J. Excelce. "Changes in customer perceptions towards online food ordering services through food apps (Swiggy&Zomato): An empirical study." In AIP Conference Proceedings, vol. 2393, no. 1, p. 020032. AIP Publishing LLC, 2022.
- [2]. Sengupta, Mousumi, Nilanjan Sengupta, and Suma Raghupathi. "A Case Study on Pizza Hut: Competitors' Envy, Consumers' Choice." (2012).
- [3]. Mondurailingam, M., V. Jeyaseelan, and A. K. Subramani. "Comparative study on customer satisfaction towards KFC and McDonalds, Chennai." ZENITH International Journal of Multidisciplinary Research 5, no. 6 (2015): 50-62.
- [4]. Mike, Barry, and J. W. Slocum. "Changing Culture at Pizza Hut and Yum! Brands, Inc." Organizational Dynamics 32 (2003): 319-330.
- [5]. Jayalakshmi VA, M. Ramachandran, Vimala Saravanan, Ashwini Murugan, "A Review on Forecasting Exchange Rate and Volatile Using SPSS Analysis", REST Journal on Data Analytics and Artificial Intelligence, 1(3), (2022):9-18.
- [6]. Kimes, Sheryl E., and Philipp Laque. "Online, mobile, and text food ordering in the US restaurant industry." (2011).
- [7]. Kshirsagar, Pravin, and Dr Sudhir Akojwar. "Classification and Prediction of Epilepsy using FFBPNN with PSO." In IEEE international conference on communication networks, vol. 17. 2015.
- [8]. Nautiyal, Aditi, and Amit Kumar Mishra. "Machine learning approach for intelligent prediction of petroleum upstream stuck pipe challenge in oil and gas industry." Environment, Development and Sustainability (2022): 1-27.
- [9]. Tobing, Roy Deddy Hasiholan. "A food ordering system with delivery routing optimization using global positioning system (GPS) technology and google maps." Internetworking Indonesia Journal 8, no. 1 (2016): 17-21.
- [10]. Chaudhari, Rakesh, Asha Ingle, and Kanak Kalita. "Experimental Investigation of Correlation of Grain Size and Mechanical Properties in 304 Stainless Steel." Materials Focus 5, no. 5 (2016): 440-445.
- [11]. Hongzhen, X. U., Tang Bin, and Song Wenlin. "Wireless food ordering system based on web services." In 2009 Second International Conference on Intelligent Computation Technology and Automation, vol. 4, pp. 475-478. IEEE, 2009.
- [12]. Akojwar, Dr Sudhir, Pravin Kshirsagar, and Vijetalaxmi Pai. "Feature extraction of EEG signals using wavelet and principal component analysis." In National Conference on Research Trends In Electronics, Computer Science & Information Technology and Doctoral Research Meet. 2014.
- [13]. Das, Jyotishman. "Consumer perception towards "online food ordering and delivery services": an empirical study." Journal of Management (JOM) 5, no. 5 (2018): 155-163.
- [14]. Vimala Saravanan, Babila revathy M, M Ramachandran, Ashwini Murugan, "Understanding Indian Technical Institution using TOPSIS MCDM Method", REST Journal on Data Analytics and Artificial Intelligence , 1(1), (2022):23-29
- [15]. Zulkarnain, Kedah, Haque Ahasanul, and Ahmed Selim. "Key success factors of online food ordering services: An empirical study." Malaysian institute of Management 50, no. 2 (2015): 19-36.
- [16]. Farooqui, Nafees Akhter, Amit Kumar Mishra, and Ritika Mehra. "IOT based Automated Greenhouse Using Machine Learning Approach." International Journal of Intelligent Systems and Applications in Engineering 10, no. 2 (2022): 226-231.
- [17]. Alagoz, Serhat Murat, and Haluk Hekimoglu. "A study on TAM: Analysis of customer attitudes in online food ordering system." Procedia-Social and Behavioral Sciences 62 (2012): 1138-1143.
- [18]. Hatim, Shahirah Mohamed, Nur Azmina Mohamad Zamani, Lily Marlia Abdul Latif, Mahani Ahmadkardri Normah Ahmad, and Norhaslinda Kamaruddin Azham Hussain. "E-FoodCart: An Online Food Ordering Service." Shahirah Mohamed Hatim 8, no. 4 (2019).
- [19]. Chaudhari, Rakesh, Praveen Kumar Loharkar, and Asha Ingle. "Medical Applications of Rapid Prototyping Technology." In Recent Advances in Industrial Production, pp. 241-250. Springer, Singapore, 2022.
- [20]. Vimala Saravanan, M. Ramachandran, Vidhiya Prasanth, "Exploring various Silver Nanoparticles and Nanotechnology", REST Journal on Advances in Mechanical Engineering, 1(1), (2022);17-24.
- [21]. Akojwar, Sudhir G., and Pravin R. Kshirsagar. "Performance evolution of optimization techniques for mathematical benchmark functions." International Journal of Computers 1 (2016).



- [22]. Raina, Ashish, Varinder Singh Rana, and Arun Singh Thakur. "Popularity of online food ordering and delivery services-a comparative study between Zomato, Swiggy and Uber eats in Ludhiana." *International Journal of Management, Technology and Engineering* 9, no. 3 (2019): 6080-6088.
- [23]. Arya, Vishakha, Amit Kumar Mishra, and Alfonso González-Briones. "Analysis of sentiments on the onset of COVID-19 using machine learning techniques." *ADCAIJ: Advances in Distributed Computing and Artificial Intelligence Journal* 11, no. 1 (2022): 45-63.
- [24]. Hsiao, Kuo-Lun, and Chia-Chen Chen. "What drives continuance intention to use a food-ordering chatbot? An examination of trust and satisfaction." *Library Hi Tech* (2021).
- [25]. Raibagi, Tejas, Ashwin Vishwakarma, Jahnavi Naik, Rujata Chaudhari, and Geetanjali Kalme. "Orderista-AI-based Food Ordering Application." In *2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS)*, pp. 34-37. IEEE, 2021.
- [26]. Vimala Saravanan, M. Ramachandran, Chandrasekar Raja, "A Study on Aircraft Structure and Application of Static Force", *REST Journal on Advances in Mechanical Engineering*, 1(1), (2022):1-6.
- [27]. Patil, Niteen, M. R. Patil, Rakesh Chaudhari, and Praveen Kumar Loharkar. "Investigation on the Machining of Inconel-718 Using EDM." In *Recent Advances in Smart Manufacturing and Materials*, pp. 129-136. Springer, Singapore, 2021.
- [28]. Kimes, Sheryl E. "The current state of online food ordering in the US restaurant industry." (2011).
- [29]. Kshirsagar, Pravin R., Anil N. Rakhonde, and Pranav Chippalkatti. "MRI image based brain tumor detection using machine learning." *Test Engineering and Management* 81 (2020): 3672-3680.
- [30]. Kumar, Nishant. "Service quality and behavioral intention: the mediating effect of satisfaction in online food ordering services." In *e-journal-First Pan IIT International Management Conference-2018*. 2020.
- [31]. Raju, Shathaboina, and K. Raji Reddy. "Seed Industry in Andhra Pradesh-Problems and Prospects of Seed Producers: An Empirical Study." *International Journal* 3, no. 4 (2015).
- [32]. Farooqui, Nafees Akhter, Amit Kumar Mishra, and Ritika Mehra. "Automatic crop disease recognition by improved abnormality segmentation along with heuristic-based concatenated deep learning model." *Intelligent Decision Technologies Preprint*: 1-23.
- [33]. SHIPMAN, Zehra Dilistan. "Understanding online food ordering: How the process results in satisfaction of the customers." *Beykoz Akademi Dergisi* 7, no. 2 (2019): 81-90.
- [34]. Tibadia, Rajkumar, Koustubh Patwardhan, Dhruvil Patel, Dinesh Shinde, and Rakesh Chaudhari. "Optimisation of drilling parameters for minimum circularity error in FRP composite." *International Journal of Materials Engineering Innovation* 10, no. 4 (2019): 271-285.
- [35]. Zavadskas, Edmundas Kazimieras, and Zenonas Turskis. "A new additive ratio assessment (ARAS) method in multicriteria decision-making." *Technological and economic development of economy* 16, no. 2 (2010): 159-172.
- [36]. Mohini Pooja Huggahalli, M. Ramachandran, Vimala Saravanan, Ashwini Murugan, "Analysis of Operations Manager System Using Weighted Sum Model (WSM) Method", *REST Journal on Banking, Accounting and Business*, 1(3), (2022):26-33.
- [37]. Kshirsagar, Pravin R., and Sudhir G. Akojwar. "Prediction of neurological disorders using optimized neural network." In *2016 International Conference on Signal Processing, Communication, Power and Embedded System (SCOPEs)*, pp. 1695-1699. IEEE, 2016.
- [38]. Zavadskas, Edmundas Kazimieras, Zenonas Turskis, and Tatjana Vilutiene. "Multiple criteria analysis of foundation instalment alternatives by applying Additive Ratio Assessment (ARAS) method." *Archives of civil and mechanical engineering* 10, no. 3 (2010): 123-141.
- [39]. Chaudhari, Rakesh, and Asha Ingle. "Finite Element Analysis of Dissimilar Metal Weld of SA335 P11 and SA312 TP304 Formed By Transition Grading Technique." *Materials Today: Proceedings* 5, no. 2 (2018): 7972-7980.
- [40]. Mishra, Amit Kumar, and Shweta Paliwal. "Mitigating cyber threats through integration of feature selection and stacking ensemble learning: the LGBM and random forest intrusion detection perspective." *Cluster Computing* (2022): 1-12.
- [41]. Chary, D. Thiruvengala, Shathaboina Raju, D. Ravinder, and K. Raji Reddy. "Factors influencing consumers to invest in Cryptocurrency: Implications for the Indian Society: An Explanatory Study."
- [42]. Ghenai, Chaouki, Mona Albawab, and Maamar Bettayeb. "Sustainability indicators for renewable energy systems using multi-criteria decision-making model and extended SWARA/ARAS hybrid method." *Renewable Energy* 146 (2020): 580-597.
- [43]. Stanujkic, Dragisa, and Rodoljub Jovanovic. "Measuring a quality of faculty website using ARAS method." In *Proceeding of the International Scientific Conference Contemporary Issues in Business, Management and Education*, vol. 545, p. 554. 2012.

- [44]. Kshirsagar, Pravin, Akshay Pote, K. K. Paliwal, Vaibhav Hendre, Pranav Chippalkatti, and Nikhil Dhabekar. "A review on IOT based health care monitoring system." ICCCE 2019 (2020): 95-100.
- [45]. Krishna Kumar TP, Vimala Saravanan, M. Ramachandran, Manjula Selvam, "A Market Segmentation Assessment Weighted Scoring for Using WSM Method An Study for Different Market", REST Journal on Banking, Accounting and Business, 1(3), (2022):1-8
- [46]. Farooqui, Nafees Akhter, Amit Kumar Mishra, and Ritika Mehra. "Concatenated deep features with modified LSTM for enhanced crop disease classification." International Journal of Intelligent Robotics and Applications (2022): 1-25.
- [47]. Kutut, Vladislavas, E. K. Zavadskas, and M. Lazauskas. "Assessment of priority alternatives for preservation of historic buildings using model based on ARAS and AHP methods." Archives of civil and mechanical engineering 14, no. 2 (2014): 287-294.
- [48]. Mehra, Jihan, Kushank Khandelwal, Aditya Jain, Rushikesh Dandagwhal, and Rakesh Chaudhari. "FEA of Femur Bone Implant of Calcium, PEEK, Ti-6Al-4V Alloy and 316L Steel." In Recent Trends in Materials, pp. 127-141. Springer, Singapore, 2022.
- [49]. RAJU, SHATHABOINA, and D. THIRUVENGALA CHARY. "The Influence of Covid-19 on Consumer Behavior in Telangana State Regarding Fast-Moving Consumer Goods (FMCG): A Study."
- [50]. Liu, Nana, and Zeshui Xu. "An overview of ARAS method: Theory development, application extension, and future challenge." International Journal of Intelligent Systems 36, no. 7 (2021): 3524-3565.