



THE EFFECT OF REPUTATION AND PROMOTION ON LOYAL BEHAVIOR OF SHARIA BANK CUSTOMERS (A STUDY AT SHARIA BANK IN DKI JAKARTA)

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Abstract

This study aims to examine the effect of reputation and promotion on the loyalty behavior of Islamic bank customers in a study at Islamic banks in DKI Jakarta. The research was conducted using quantitative methods. Observations use a cross-section/one-shot time scope, namely in 2022. The unit analysis of the research is Islamic banks in DKI Jakarta, while the unit of observation is the customers of Sharia Banks in DKI Jakarta. Data were taken from a sample of 100 respondents and analyzed using PLS. The results of the study illustrate that reputation and promotion contribute to shaping the loyalty behavior of Islamic bank customers in DKI Jakarta. Reputation has a bigger role in shaping loyalty behavior than promotion. The findings in this study provide managerial implications for the management of Islamic banks in DKI Jakarta that efforts to create and improve customer loyalty behavior can be carried out through efforts to improve reputation, especially a good reputation in the perception of customers' colleagues and friends, reputation compared to competing banks, and reputation in the market general. Priority needs to be given to reputation development. The promotion also needs to be carried out through various elements, especially in the publicity element, followed by personal selling, viral marketing, advertising, sales promotion, and direct marketing to support the role of reputation in increasing the loyalty behavior of Islamic banks.

Keywords: reputation, promotion, loyalty behaviour.

PRELIMINARY

Bisnis.com website (15 November 2021) states that data as of June 2021 shows the growth of Islamic banking is superior to conventional banking, both in terms of assets, credit or financing, and deposits. Sharia bank assets were recorded at Rp632 trillion or grew 15.80 percent year-on-year (yoy). Meanwhile, conventional banking only grew 8.07 percent yoy to Rp. 8,954 trillion.

Likewise, in terms of credit or financing, Islamic banks recorded a growth of 7.35 percent yoy to Rp. 405 trillion, while conventional banks recorded growth of 0.17 percent yoy to Rp. 5,302 trillion. The same thing happened to sharia bank deposits, which were superior with 16.54 percent yoy growth to Rp501 trillion. Meanwhile, conventional banks grew 10.88 percent yoy to Rp6.586 trillion.

The growth of sharia banking performance is supported by, among other things, the increase in Shariah lifestyle, in addition to the support from the government for sharia banking. Islamic banking in Indonesia has large business expansion because population majority is Muslim. However, this potential has not been fully utilized optimally. In addition, the phenomenon shows that the loyalty of Islamic bank customers in Indonesia is not yet high.

On the other hand, based on Hosseini and Shahmoradi (2022) examine customer satisfaction and loyalty in their effect on the financial performance of Resalat Bank in Iran. The results showed a positive and significant effect of customer loyalty and satisfaction on the financial performance of Resalat Bank. The results of this study indicate that customer loyalty is important for improving bank performance. Meanwhile, base on Bayu Arie Fianto et al. (2020) show that customers have different perceptions about state-owned and private Islamic banks. State-owned bank customer loyalty is strongly influenced by customer engagement and in private Islamic banks, customer satisfaction has the strongest influence in forming loyalty. Meanwhile, Babiü-Hodoviü et al. (2011) stated that the reputation of a bank company affects the company's perception of the value of the service it receives, and thus its satisfaction and loyalty. Similarly, research by Helm S. (2007) suggests that a firm's reputation influences customer loyalty and may partly offset one's own experience. The same thing was found in the research of Ali, Leifu, and Rehman (2014) that service quality, trust, and reputation had a positive effect on customer loyalty.

Another study found that loyalty is influenced by promotion. Aliata et al. (2012) examine the nature and influence of the relationship between bank promotion strategies and their performance. It was found that there was a positive relationship between spending on promotion strategies and bank performance. Ezu et al. (2018) show that the utilization of promotional strategies by banks greatly increases their level of performance and allows banks to grow significantly. The findings also show that the promotion strategy undertaken by the bank boosts customer deposit rates and increases deposit rates as well as encourages bank patronage thereby contributing to bank growth and performance. Similarly, Bireda (2020) found that variation in organizational performance is determined jointly by five promotional strategies (advertising, sales promotion, personal selling, public relations, and direct marketing).

Based on the results of these studies, as well as against the background of the increasing performance of Islamic banking, it is necessary to conduct a study to examine whether reputation and promotion affect customer loyalty to Islamic banks. The research will be conducted at Islamic banks in DKI Jakarta, considering that all Islamic banks have offices in the city. Therefore, this study aims to examine the effect of reputation and promotion on the loyalty behavior of Islamic bank customers in a study at Islamic banks in DKI Jakarta.

LITERATURE REVIEW

Reputation

According to Ruiz et al. (2016), company reputation is an indicator of the overall quality of business actions which is a valuable resource that is difficult to imitate. Fombrun (2001), in the view of consumers, the company's reputation is the accumulation of consumers' assessment of the credibility, reliability, responsibility, and trust built by the company. In the banking sector, Babiü-Hodoviü et al. (2011) examine bank reputation based on three things. First, the bank has a good reputation among colleagues and friends. Second, the bank has a good reputation compared to its competitors. Last, the bank has a good reputation in the market in general. Based on the unit of analysis studied in this study, the dimensions used to measure reputation are the opinions of Babiü-Hodoviü et al. (2011).

Promotion

Promotion is an organization's direct way of reaching its public which is done through the five elements of the promotion mix which include advertising, sales promotion, personal selling, public relations, and direct marketing (Czinkota& Ronkainen, 2004). Aliata et al. (2012) examined promotion variables which include elements: advertising, personal selling, sales promotion, publicity, direct marketing, and viral marketing. Meanwhile, Bireda (2020) examines promotional strategies with elements including advertisement, sales promotion, personal selling, public relations, and direct marketing. In this study, promotion includes the elements presented by Aliata et al. (2012) examined promotion variables which include elements: advertising, personal selling, sales promotion, publicity, direct marketing, and viral marketing.

Loyalty behaviour

According to Segoro (2013), customer loyalty is explained in three ways: first, the loyalty shown through customer behavior with repeat purchases; second, the loyalty shown through customer attitudes about the company (this factor includes preference and commitment to the brand and recommend it to others) and third, the composition of customer behavior and attitudes about the company.

Customer loyalty in the banking industry is seen as a key connection and desire for hierarchical achievement, benefits, and business execution. (Rasheed et al. 2015). Customer loyal behavior according to Griffin (2002) is the result of a process of serious attention to what can make customers feel at home and the company's ability to continuously fulfill it. Loyalty according to Griffin (2002) is characterized by making repeat purchases, buying outside the product/service line, inviting others, and showing immunity from the pull of competition.

In this study, loyalty behavior was measured based on the opinion of Griffin (2002), namely: making regular repeat purchases, buying outside the product/service line, inviting others, and having immunity from the pull of competition.

Hypothesis

Babiü-Hodoviü et al. (2011) stated that the reputation of a bank company affects the company's perception of the value of the service it receives, and thus its satisfaction and loyalty. Similarly, research by Helm S. (2007) suggests that a firm's reputation influences customer loyalty and may partly offset one's own experience. The same thing was found in the research of Ali, Leifu, Rehman (2014) that service quality, trust, and reputation had a positive effect on customer loyalty. Based on this, the following hypotheses are formulated:

H1: Reputation has a positive effect on loyalty behavior

promotion strategies and their performance. It was found that there was a positive relationship between spending on promotion strategies and bank performance. Ezu et al. (2018) show that the use of promotional strategies by banks greatly increases their level of performance and allows banks to grow significantly. The findings also show that the promotion strategy undertaken by the bank boosts customer deposit rates and increases deposit rates as well as encourages bank patronage thereby contributing to bank growth and performance. Similarly, Bireda (2020) found that variation in organizational performance is determined jointly by five

promotional strategies (advertising, sales promotion, personal selling, public relations, and direct marketing). Based on this, the following hypotheses are formulated:

H2: Promotion has a positive effect on loyalty behavior

METHODOLOGY

The research was conducted using quantitative methods. Quantitative research is more systematic, planned, structured, and clear from the beginning to the end of the research. This quantitative approach is used to identify all the concepts that are the research objectives (Malhotra, 2010).

Causality research is carried out to test the truth/facts/principles of knowledge that already exist in Islamic banks in DKI Jakarta. "Causality research is used to abstain evidence of cause-and-effect (causal) relationship" (Malhotra, 2010, p.113).

Observations using the time horizon are cross-section / one-shot, meaning that the information or data obtained is the result of research conducted at a certain time, namely in 2022.

The unit of analysis according to Sekaran (2010, p. 132) is "a unit of analysis referring to the level of aggregation of the data collected during the subsequent data analysis stage". So the unit of analysis of the research is the Islamic bank in DKI Jakarta, while the unit of observation is the customer of the Sharia Bank in DKI Jakarta. Data were taken from a sample of 100 respondents and analyzed using PLS.

4. RESULT AND DISCUSSION

4.1 Model Evaluation

a. Outer Model

The Outer Model is a measurement model that identifies the relationship between variables and their indicators as manifest variables. The following table shows the results of the measurement model processed with the SmartPLS3.0 application.

Table 1. Outer Model

| Variable | Indicator | Loading Factor (λ) | t count | Prob. | Average Variance Extracted (AVE) | Composite Reliability (CR) |
|------------|----------------------------------------------------------|--------------------------|---------|-------|-------------------------------------------|----------------------------------|
| Reputation | Bank has a good reputation among colleagues and friend | 0,852 | 18,957 | 0,000 | 0,643 | 0,844 |
| | Bank has a good reputation compared to their competitors | 0,788 | 18,165 | 0,000 | | |
| | Bank has a good reputation in the market in general | 0,764 | 11,975 | 0,000 | | |

| Promotion | Advertising | 0,675 | 7,583 | 0,000 | 0,525 | 0,868 |
|-----------|----------------------------------------------|-------|--------|-------|-------|-------|
| | Personal selling | 0,736 | 11,031 | 0,000 | | |
| | Sales promotion | 0,672 | 5,947 | 0,000 | | |
| | Publicity | 0,850 | 15,732 | 0,000 | | |
| | Direct marketing | 0,664 | 8,481 | 0,000 | | |
| | Viral marketing | 0,733 | 7,853 | 0,000 | | |
| Loyalty | Repeat | 0,796 | 16,871 | 0,000 | 0,698 | 0,902 |
| Behaviour | transactions | | | | | |
| | Transactions outsidethe product/service line | 0,852 | 25,826 | 0,000 | | |
| | Recommendation | 0,873 | 30,806 | 0,000 | | |
| | Immunity | 0,819 | 21,444 | 0,000 | | |

Test the model, it can be done by testing the convergent validity of the reflective model by looking at the loading factor value. Each observed variable (indicator) is considered valid if the loading factor value is above 0.5. Table 1 explains that all loading factor values of the observed variables are greater than 0.5 (valid) with aprob value. < 0.05 (α) so that all indicators are suitable for use in the model. AVE value > 0.5 and Composite Reliability (CR) of each latent variable has a value above 0.7, meaning that all measurement models have high reliability.

b. Inner Model (StructuralModel)

The evaluation of the inner model is described using R-square, and Goodness of Fit (GoF). According to Chin (1998), the R-Square value is 0.67 strong, 0.33 moderate, and 0.19 weak. GOF is used to validate between measurements and structural models where the values are 0 - 0.25 (small), 0.25-0.36 (medium), and > 0.36 (large).

| Tuble 2. Livatausi Innet Wodel | | | | | | | |
|--------------------------------|--------------|-------------|-----------------------------------|--|--|--|--|
| Variable | R- Square | Communality | Goodness of Fit (GoF) Index | | | | |
| Loyalty | 0,416 | 0,698 | | | | | |
| Behaviour | | | 0.500 | | | | |
| Promotion | - | 0,525 | 0,509 | | | | |
| Reputation | - | 0,643 | | | | | |

Table 2. Evaluasi Inner Model

Table 2 explains that the R2 value on the endogenous Loyalty Behavior construct is in the medium category and the GOF value is in a large category so it can be concluded that the research model is fit.

4.2 Hypothesis Test

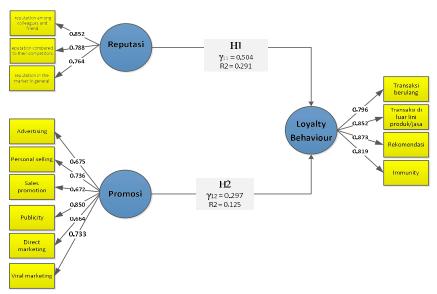
The results of hypothesis testing are shown in Table 3 below:

| Table | 3.Hy | poth | esis | T | est |
|-------|-------------|------|------|---|-----|
|-------|-------------|------|------|---|-----|

| Hip | Structural Model | Path Coeff. | Std. Error | t- value | Prob. | R ² | Conclusion |
|-----|---------------------------------|-------------|---------------|-------------|-------|----------------|-------------|
| 1 | Reputation -> Loyalty Behaviour | 0,504 | 0,095 | 5,289 | 0,000 | 0,291 | significant |
| 2 | Promotion -> Loyalty Behaviour | 0,297 | 0,067 | 4,450 | 0,000 | 0,125 | significant |

The calculation results show that the model explains the contribution of 41.6%. (Overall squared R = 0.416) and the model fit with GOF 0.509 (> 0.36 (large). In general, the research model is supported by empirical conditions.

The results of hypothesis testing indicate that there is a positive and significant effect of promotion and reputation on Loyalty Behavior (prob < 0.05). Reputation (γ = 0.504, prob < 0.05) on Loyalty Behavior is positive with R2 of 0.291 so Reputation is dominant in influencing Loyalty Behavior. The following, research results are presented in Figure 1.



Picture1. Research Result

The results of the study illustrate that reputation and promotion contribute to forming loyalty behavior. Reputation is more dominant in shaping loyalty behavior than promotion. For Islamic banks, reputation plays a more important role in building customer loyalty.

Islamic bank customers become more loyal because of the bank's good reputation in the perception of customers' colleagues and friends, its reputation compared to competing banks, and reputation assessment in the market in general. These aspects are more valuable in creating loyalty behavior for Islamic bank customers compared to promotions carried out by Islamic banks.

Customer loyalty is one of the most important indicators used to evaluate the quality of services offered by an organization. Gaining customer loyalty is a key goal for banking organizations

that decide to adopt a relationship marketing perspective (Filip and Anghel, 2007). Therefore, Islamic banks continue to strive to increase customer loyalty so that their performance continues to improve. The findings of this study can be a managerial recommendation that banks need to continue to improve their reputation to increase customer loyalty, in addition to continuing to make promotional efforts. The most dominant aspect of reputation shaping loyalty behavior is the reputation of the bank among customers' friends and colleagues, then the reputation of the bank when compared to competing banks, and the reputation of the bank in the market in general.

Based on the results of this study, it was revealed that promotion also had a positive influence on the creation of loyalty behavior for Islamic bank customers. Promotional aspects that contribute to loyalty behavior sequentially are publicity, followed by personal selling, viral marketing, advertising, sales promotion, and direct marketing. These aspects can make customers loyal. These promotional elements need to be carried out by Islamic banks as a medium to boost customer loyalty behavior.

Based on the results of this study, it can be said that reputation building, and promotion implementation are important aspects for Islamic banks to increase loyalty behavior. Priority needs to be given to reputation development.

On the other hand, promotion can also be used as a means to improve the reputation of Islamic banks, so that these two aspects can work together to increase loyalty behavior. The reputation of the bank can be increased through promotional media. In other words, the promotional media run by Islamic banks can be a medium to improve the bank's reputation to be able to increase loyalty behavior.

CONCLUSION

The results of the study illustrate that reputation and promotion contribute to shaping the loyalty behavior of Islamic bank customers in DKI Jakarta. Reputation has a bigger role in shaping loyalty behavior than promotion.

The findings in this study provide managerial implications for the management of Islamic banks in DKI Jakarta that efforts to create and improve customer loyalty behavior can be carried out through efforts to improve reputation, especially a good reputation in the perception of customers' colleagues and friends, reputation compared to competing banks, and reputation in the market general. Priority needs to be given to reputation development.

The promotion also needs to be pursued through various elements, namely publicity, followed by personal selling, viral marketing, advertising, sales promotion, and direct marketing to support the role of reputation in increasing the loyalty behavior of Islamic banks. Promotional media can be a medium to improve the bank's reputation to increase loyalty behavior.

Bibliography

Ali, R., Leifu, G., Rehman, R.U. 2014. Factors influencing customer loyalty of banking industry: empirical evidence from Pakistan. *International Journal of Learning & Development*, 4(2), 9-26

Aliata, V. L., Odondo, A.J., Aila, F.O., Ojera, P.B., Abong'O, B.E., Odera, O. (2012). Influence of Promotional Strategies on Banks Performance. *International Journal of Business, Humanities and Technology*, 2(5), 169-178.

Anggraeni, R. (2021). Kinerja Bank Syariah Lebih Moncer ketimbang Konvensional di Era Pandemi, dalam https://finansial.bisnis.com/read/20211115/231/1466159/kinerja-bank-syariah-lebih-moncer-ketimbang-konvensional-di-era-pandemi-kok-bisa diakses tanggal 11 Agustus

Babiü-Hodoviü, V., Mehiü, E., Arslanagiü, M. (2011). Influence of Banks' Corporate Reputation on Organizational Buyers Perceived Value. *Procedia Social and Behavioral Sciences* 24, 351–360

Bayu Arie Fianto, Christopher Gan, Tika Widiastuti&RadityaSukmana | (2020) Customer loyalty to Islamic banks: Evidence from Indonesia. *Cogent Business & Management*, 7(1), 1859849, DOI: 10.1080/23311975.2020.1859849

Bireda, H. (2020). The Effects of Promotion Strategies on Bank Performance the Case of Dashen Bank S.C (From Employees Perspective). Partial fulfillment of the requirements for the degree of Master of Arts in Business Administration at St' Mary's University. Addis Ababa, Ethiopia.

Chin, W. W. (1998). The Partial Least Squares Approach to Structural EquationModeling. *Modern Methods for Business Research*, 295, 336.

Czinkota, M.R. and Radebaugh, L.H. (2004). *International Business: Environments and Operations*, 9th ed. Upper Saddle River. NJ.

Ezu, G.K., Uzoamaka, C-E., & Gloria (2018). The Influence of Promotional Strategies on the Performance of Nigerian Banks. A Study of Selected Banks in Nigeria. *International Journal of Trend in Scientific Research and Development (IJTSRD) International Open Access Journal*, 3(1), 278-286.

Fombrun, C. (2001). The Reputational Landscape. *Corporate Reputation Review*, 1(1 and 2). Griffin, J. (2002). *Customer Loyalty: How to Earn It, How to Keep It*. New and Revised Edition. Kentucky: McGraw-Hill.

Helm S. (2007). The Role of Corporate Reputation in Determining Investor Satisfaction and Loyalty. *Corp Rep Rev*, 10(1), 22-37

Hosseini, S.S. and Shahmoradi, B. (2022). Study the Impact of Customers' Loyalty and Satisfaction on Bank's Financial Performance (A Case Study of Resalat Bank). *British Journal of Economics, Management & Trade, 12*(4), 1-11

Malhotra, N.K. (2010). *Marketing Research: An Applied Orientation*. Edition, 6. Prentice Hall. Rasheed, H.M.W., Sajid, M., Shahid, N., Ahmad, M. 2015. Facrors affecting customer loyalty in Banking sector: a study on banks in Bahawalpur (Pakistan). *International journal of accounting and financial reporting*, 5(1), 239-254.

Rashid, M.H.U., Nurunnabi, M., Rahman, M., and Masud, M.A.K. (2020). Exploring the Relationship between Customer Loyalty and Financial Performance of Banks: Customer Open Innovation Perspective. *J. Open Innov. Technol. Mark. Complex*, 6(108), 1-19.doi:10.3390/joitmc6040108.

Ruiz, B., Garcia, J.A., Revilla, A. 2016. Antecedents and consequences of bank reputation: a comparison of the United Kingdom and Spain. *International Marketing Review, 33*(6), 1-6. Segoro W. (2013). The influence of perceived service quality, mooring factor, and relationship quality on customer satisfaction and loyalty. *Social and Behavioral Services,* 81, 306-310. *Sekaran,* U. (2010). *Research Methods for Business: A Skill-Building Approach.* 4th Edition, John Wiley & Sons, UK.

Mehraj, H., Jayadevappa, D., Haleem, S. L. A., Parveen, R., Madduri, A., Ayyagari, M. R., & Dhabliya, D. (2021). Protection motivation theory using multi-factor authentication for providing security over social networking sites. Pattern Recognition Letters, 152, 218-224.

Soni, M., Khan, I. R., Babu, K. S., Nasrullah, S., Madduri, A., & Rahin, S. A. (2022). Light weighted healthcare CNN model to detect prostate cancer on multiparametric MRI. Computational Intelligence and Neuroscience, 2022.

Sreenivasu, S. V. N., Gomathi, S., Kumar, M. J., Prathap, L., Madduri, A., Almutairi, K., ... & Jayadhas, S. A. (2022). Dense convolutional neural network for detection of cancer from CT images. BioMed Research International, 2022.

Sharma, D. K., Chakravarthi, D. S., Boddu, R. S. K., Madduri, A., Ayyagari, M. R., & Khaja Mohiddin, M. (2022, June). Effectiveness of machine learning technology in detecting patterns of certain diseases within patient electronic healthcare records. In Proceedings of Second International Conference in Mechanical and Energy Technology: ICMET 2021, India (pp. 73-81). Singapore: Springer Nature Singapore.

Mannepalli, K., Vinoth, K., Mohapatra, S. K., Rahul, R., Gangodkar, D. P., Madduri, A., ... & Mohanavel, V. (2022). Allocation of optimal energy from storage systems using solar energy. Energy Reports, 8, 836-846.

Rubavathy, S. J., Kannan, N., Dhanya, D., Shinde, S. K., Soni, N. B., Madduri, A., ... & Sathyamurthy, R. (2022). Machine Learning Strategy for Solar Energy optimisation in Distributed systems. Energy Reports, 8, 872-881.

Bansal, P., Ansari, M. J., Ayyagari, M. R., Kalidoss, R., Madduri, A., & Kanaoujiya, R. (2023, April). Carbon quantum dots based nanozyme as bio-sensor for enhanced detection of glutathione (U) from cancer cells. In AIP Conference Proceedings (Vol. 2603, No. 1). AIP Publishing.

Kadam, P. S., Rajagopal, N. K., Yadav, A. K., Madduri, A., Ansari, M. J., & Patil, P. Y. (2023, April). Biomedical waste management during pandemics. In AIP Conference Proceedings (Vol. 2603, No. 1). AIP Publishing.

Torres-Cruz, F., Nerkar Charushila, K., Chobe Santosh, S., Subasree, N., Madduri, A., & Pant, B. (2023, April). A review on future prospects on magnetic levitation for disease diagnosis. In AIP Conference Proceedings (Vol. 2603, No. 1). AIP Publishing.

Sugumar, D., Dixit, C. K., Saavedra-Lopez, M. A., Hernandez, R. M., Madduri, A., & Pant, B. (2023, April). White matter microstructural integrity in recovering alcoholic population. In AIP Conference Proceedings (Vol. 2603, No. 1). AIP Publishing.

Durga Bhavani, K., Ferni Ukrit, M. Design of inception with deep convolutional neural network based fall detection and classification model. Multimed Tools Appl (2023). https://doi.org/10.1007/s11042-023-16476-6

K. Durga Bhavani, Dr. Radhika N. (2020). K-Means Clustering using Nature-Inspired Optimization Algorithms-A Comparative Survey. International Journal of Advanced Science and Technology, 29(6s), 2466-2472.

K. D. Bhavani and M. F. Ukrit, "Human Fall Detection using Gaussian Mixture Model and Fall Motion Mixture Model," 2023 5th International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, India, 2023, pp. 1814-1818, doi: 10.1109/ICIRCA57980.2023.10220913.

Nigam, P., Waghmode, S., Yeware, A., Nawale, L., Dagde, P., Dhudhane, A., & Sarkar, D. (2014). Aptamer functionalized multifunctional fluorescent nanotheranostic platform for pancreatic cancer. Journal of Nanopharmaceutics and Drug Delivery, 2(4), 280-287.

Alegaonkar, A. P., Kumar, A., Alegaonkar, P. S., Waghmode, S. A., & Pardeshi, S. K. (2014). Exchange interaction of itinerant electron donors of tetrakis (dimethylamino) ethylene with localized electrons in graphene. Synthesis and Reactivity in Inorganic, Metal-Organic, and Nano-Metal Chemistry, 44(10), 1477-1482.

MESRAR, M., LAMCHARFI, T., ECHATOUI, N., ABDI, F., & AHJYAJE, F. (2019). AJ Csian OURNALOF HEMISTRY AJ Csian OURNALOF HEMISTRY. Asian Journal of Chemistry, 31(2), 309-316.

Mane, V., Lalaso, M., Waghmode, S., Jadhav, K. D., Dongare, M. K., & Dagade, S. P. (2014). Nitration of benzene using mixed oxide catalysts. IOSR J. Appl. Chem, 7, 50-57.

Mahind, L. H., Waghmode, S. A., Nawale, A., Mane, V. B., & Dagade, S. P. (2013). Evaluation of antimicrobial activities of zirconium (IV) complex. J Pharm Biol Sci, 5, 102-5.

Vanjare, K. J., & Waghmode, S. (2020). Lipase enzyme based green chemistry detergents for cleaning industry.

Dagade, S. P., Mane, V. B., Jape, A. A., Waghmode, S. A., Dhapte, V. V., & Mahind, L. H. (2012). Synthesis, Characterization and Antimicrobial Study of Cr (III), Mn (II), Y (III) and Zr (IV) Schiff Base Complexes. Int. J. of Chem. Anal. Sci, 12, 1672-1674.

Shaikh, A., Meroliya, H., Dagade-Gadale, S., & Waghmode, S. (2021). Applications of Nanotechnology in Precision Agriculture: A review.

Kadam, S., Patul, V., Waghmode, S., & Dagade-Gadale, S. (2021). Use of Nano pesticide in Agriculture and its Toxicity—A Review.

Waghmode, S. A., Gupta, V. S., & Rane, S. Y. (2010). Structure-function mimicry of oxidized purple acid phosphatase-PAP ox-A new functional model.

Ganvir, V. Y., Ganvir, H. V., &Gedam, R. S. (2022). Effect of lanthanum oxide addition on physical, electrical and dielectric properties in lithium borosilicate glasses. Ferroelectrics, 587(1), 127-138.

Ganvir, H. V., Ganvir, V. Y., &Gedam, R. S. (2022). Investigation of structural and electrical properties of nickel chloride doped pyrrole aniline copolymer. Materials Today: Proceedings, 49, 1827-1832.

Ganvir, V. Y., Ganvir, H. V., &Gedam, R. S. (2022). Physical and optical study of Nd2O3 doped sodium borosilicate glasses. Materials Today: Proceedings, 51, 1201-1205.

Ganvir, V. Y., Ganvir, H. V., &Gedam, R. S. (2019). Effect of Dy2O3 on electrical conductivity, dielectric properties and physical properties in lithium borosilicate glasses. Integrated Ferroelectrics, 203(1), 1-11.

Wasnik, H. R., Kelkar, D. S., & Ganvir, V. Y. (2015). Yield analysis of copolymers: effect of temperature, feed ratio and initiator concentration on the copolymerization. Journal of Polymer Engineering, 35(2), 99-103.