Empowerment of MSMEs during the covid-19 pandemic with information technology

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ABSTRACT

Onion rambak (onion crackers) and rice karak (rice crackers) "Acha" is a home industry in Boyolali, specifically in Gumukrejo, Teras District, Boyolali Regency. Hazardous materials such as borax are not used in the ingredients that composed the karak and rambak sold by this home industry. Mrs. Sunarni, the owner, is assisted by her family in running the rambak and karak businesses. This business was started about ten years ago, but the business license had not been obtained. This company's NPWP business license was in the form of village's group NPWP. The output was substantial, with 75-100 kg of onion rambak and 50 kg of rice karak produced. Businesses dropped in sales as people's purchasing power declined due to decreased income caused by the COVID-19 pandemic. Production could be increased by changing the packaging logo to one that was more eye-catching and easier for the public to remember. In addition to serving sales through the Whatsapp application, sales were also made through e-commerce applications such as Shopee. Using online sales through e-commerce applications, the production results and sales revenue for Mrs. Sunarni's rambak and karak businesses increased.

KEYWORDS
Rambak Onion;
Karak Rice;
E-commerce;
COVID-19;
On-Line sales

1. Introduction

Onion Rambak (onion crackers) and Rice Karak (rice crackers) "Acha" is one of the home industries in Boyolali, precisely in Gumukrejo, Teras District, Boyolali Regency. This home industry sells karak and rambak without adding hazardous materials such as borax. Mrs. Sunarni, the owner of the rambak and karak business, runs her business with the help of her family. This business has been running for about ten years but does not yet have a business license. The NPWP business license is in the form of village's group NPWP. The production is quite large, with the production of onion rambak ranging between 75 and 100 kg and rice karak 50 kg. The products are available in the markets. The business was also obtainable online, but sales were discontinued due to high shipping costs. Now, sales are handled by resellers. The products can be ordered through the Whatsapp application and are mostly marketed to Yogyakarta and Semarang, other cities in the same province. One kilo of onion rambak costs Rp. 13,000, while rice karak costs Rp. 14,000. The average income received by the company is approximately Rp. 150,000 per day. The business with such income is categorized as MSMEs, micro-small-medium-enterprises.

The author reviewed research on e-commerce from previous studies to help find ways to increase the income of MSMEs during the COVID pandemic. Geetha [1] used an enhanced Bert Base Uncased model to improve the performance of aspect-based sentiment analysis. Bjrgen [2] investigated the distribution of the last sustainable mileage in urban planning. A mobile application makes modern payment much easier and more convenient. In a qualitative study, Eriksson [3] researched consumer resistance to mobile payments for in-store purchases. The effect of disconfirmation on the credibility of online reviews through an experimental analysis was studied by Jha [4]. Hulme [5] looked into the unwanted exchange, the

international trade as a direct and indirect driver of worldwide biological invasion. Effective strategies are developed to reduce the number of late orders. Cals [6] used deep reinforcement learning to solve online batching problems. The effects of digital complementarity on productivity and employment were investigated by Ballestar [7] Sanchez-Diaz [8], in his research, analyzed inequalities in access to online delivery services and how the COVID-19 pandemic affects marginalization. PENG [9] researched poverty alleviation through e-commerce: village engagement and policy demonstrations in rural China. Treiblmaier [10] investigated the impact of blockchain on e-commerce and developed a framework for a prominent research topic.

Some determinant factors must be considered when running a business. Aparicio [11] investigated gamification and reputation as primary determinants of e-commerce use and repurchase intention in his research. HAJI [12] researched the growth of e-commerce in rural and remote areas of the BRICS countries. Big data analysis can be used to design a system in the business, such as Malhotra's [13] intelligent approach to designing e-commerce metasearch and ranking systems using next-generation big data analytics. Jun [14] examined the precision marketing effectiveness of a community e-commerce-AISAS-based model. Using the Slovak Republic as an example, Dobroselskyi [15] investigated the logistics of returns in e-commerce companies. Nguyen [16] created and validated five models of customer satisfaction construction in beauty and cosmetic e-commerce research [16]. Rai [17] answered the question of how consumers use Brussels evidence-gathering points. In his investigation of an agent-based, large-scale metropolitan cargo movement simulation, Stinson [18] analyzed passenger and cargo market interactions. Tewari [19] proposed the collaborative filter, generating recommended items by combining the content and user items. Cultures affect how customers purchase goods. Pea-Garca [20] used a cross-cultural approach to investigate purchase intention and online purchasing behavior.

Ponis [21] explored augmented reality and gamification to increase productivity and job satisfaction in the warehouse of the future. Martnez-Domnguez [22] investigated Internet adoption and usage patterns in rural Mexico. Research on logistics and shipping for product distribution is essential to explore in a business. Upadhyay [23] researched the strategic progress of reverse logistics with crowd shipping and transportation for India. Using data reviews and field investigations, Bertalero [24] investigated the outsourcing conditions for freight transport and logistics among manufacturing firms. Bots are frequently used to increase online traffic. By employing an unsupervised learning approach, Rovetta [25] reviewed the use of bots in web stores. Liu [26] designed and implemented a Java-based business platform system. Gharehgozli [27] examined robot scheduling for pod retrieval in a robotic mobile fulfillment system. The impact of the COVID-19 pandemic on vegetable production and its mitigation viewed from agricultural insurance was studied by GU [28]. Chanda [29] analyzed and estimated India's foreign exchange reserves by applying soft computing techniques. Rhiat [30] investigated the combination of mobile robotics and packing for optimal delivery.

Online review behavior needs to be analyzed for the development of an online store as research conducted by Gutt [31] on reviewed system design as a strategic instrument for shaping online review behavior and economic outcomes. The impact of e-service quality and customer satisfaction on customer behavior in online shopping was investigated by Rita [32]. Online shopping in treatment-seeking patients with the purchase-shopping disorder was studied by A. Müller [33]. Adding a new flavor can increase buyer interest in purchasing a packaging product. Cohen [34] carried out the FEMA GRAS assessment of natural flavor complexes, a citrus-derived flavoring agent. Sometimes seller needs to know the purchase intent to determine the follow-up service, as aligned with Aristio's [35] research on purchase intentions of Indonesian backpackers when booking accommodation through online travel agencies. A dual market structure design for independent power grid system reform in Taiwan was set up by Tsay [36]. The application of nanoscale storage materials in cold chain logistics of fresh agricultural products e-commerce was studied by Bai [37]. Supply chain quality control of agricultural products based on Internet+ was investigated by Shen [38]. The classification of online consumer review sentiment using word vector representation was studied by Bansal [39]. Sellers can advertise in a variety of ways, including video advertising, to increase sales. It aligns with Iwashita's [40] research on a secure transaction management

framework for video advertising affiliate services. Also, human interaction should be maintained. Sulikowski [41] wrote the monitoring of human website interactions in a recommender system. Using collaboration, content-based filtering, and rating variance, Tewari [42] generated a set of top item recommendations. Gao investigated the correlation of the logistics industry with other industries, evaluation of empirical evidence from China [43].

Onion Rambak and rice Karak "Acha" development potential is lacking, considering that they were not given much attention at the start of online sales of MSME products, and the packaging of the products was said to be less catching. As a result, these MSME products are struggling to attract buyers among young people. Changing the packaging and the slogan printed on the product packaging is necessary to attract purchasing interest from young people.

2. Method

Fig. 1 depicts the detailed activity plan for implementing the program. The figure describes five activities: coordination, logo design, covid socialization, marketing, and marketing education. The first coordination activity was a preliminary visit to Onion Rambak and rice Karak "Acha", one of MSME Partners, who would be assisted from July 17-28, 2020. The second activity held from August 2–9, 2020 was to create logo designs and product slogans (to help them with logo design and selection and give them an identity of MSME Partner logos and slogans). The third activity was to socialize and provide understanding and explanation about COVID-19.

3. Results and Discussion

The author visited the rice Karak and onion Rambak Acha production house, accompanied directly by Mrs. Sunarni, the business owner. Fig. 2 shows that Mrs. Sunarni, wearing a white headscarf and white shirt, welcomed the students of Universitas Muhammadiyah Yogyakarta. The student explained to Ms. Sunarni about the program they were running.
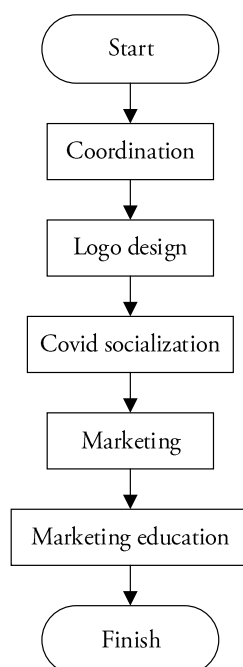

Fig. 1. Activity sequence block diagram

Fig. 2. Visits to MSME owners

Fig. 3 depicts the processes for making rice karak and onion rambak dough. The first step is to put all ingredients in a large bucket and mix them until the desired consistency is obtained.


Fig. 3. Making dough

Mrs. Sunarni is assisted by her husband while making it, as shown in Fig. 4. The figure shows that after all the dough has been processed, the rice Karak and onion rambak must go through the drying stage under direct sunlight. This drying process must be repeated until the Karak and rambak are completely dry to allow them to last longer.

Fig. 4. Manufacturing process

As a form of prevention from spreading the COVID-19 virus and increasing our awareness of the importance of washing hands before and after activities, a portable sink is installed, as seen in Fig. 5.
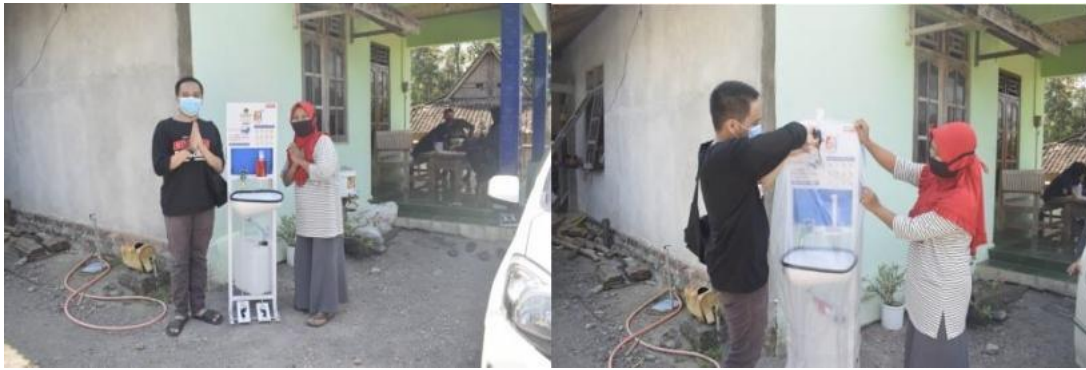
Fig. 5. Installing a sink

As shown in Fig. 6, some service community members assist Mrs. Sunarni in packing rice karak and onion rambak, and others explain marketing methods on various social media platforms such as Shopee and other marketplaces.

Fig. 6. Packing karak

Fig. 7 illustrates Marketplace and Shopee accounts for rice karak and onion rambak Acha marketing.

Fig. 7. Shopee account

The members of the service community also maintain friendly relations with local residents, provide free masks and attach stickers to residents' homes, as shown in Fig. 8. It is to ensure that they will always wear masks for protection from COVID-19. The stickers distributed to residents' homes also include information about the procedures they must follow while conducting activities outside and when returning home.

Fig. 8. Visiting local residents

4. Conclusion

The community service program of the students of Universitas Muhammadiyah, Yogyakarta Program at onion rambak and rice karak "Acha", one of the Boyolali Home Industries, aims at strengthening the empowerment of MSMEs based on information and communication technology to go to the global market during the COVID-19 pandemic. The program has been successful in creating a model of community empowerment based on information and communication technology in Boyolali, Central Java, Indonesia. It can be expanded to create a larger community of MSMEs capable of independently managing information technology applications to enhance business and increase competitiveness, welcoming the ASEAN economic community and the free market.

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Author Contribution

The activity plan to implement the program. There are five activities, namely coordination, logo design, socialization of covid, marketing, and marketing education.

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Conflict of Interest

The authors declare no conflict of interest.

References

[1]   M. P. Geetha and D. Karthika Renuka, "Improving the performance of aspect based sentiment analysis using fine-tuned Bert Base Uncased model," *Int. J. Intell. Networks*, vol. 2, no. June, pp. 64–69, 2021, doi: 10.1016/j.ijin.2021.06.005.

[2]   A. Bjørgen, K. Y. Bjerkan, and O. A. Hjelkrem, "E-groceries: Sustainable last mile distribution in city planning," *Res. Transp. Econ.*, vol. 87, p. 100805, Jun. 2021, doi: 10.1016/j.retrec.2019.100805.

[3]   N. Eriksson, A. Gökhan, and M. Stenius, "A qualitative study of consumer resistance to mobile payments for in-store purchases," *Procedia Comput. Sci.*, vol. 181, no. 2019, pp. 634–641, 2021, doi: 10.1016/j.procs.2021.01.212.

[4]   A. K. Jha and S. Shah, "Disconfirmation effect on online review credibility: An experimental analysis," *Decis. Support Syst.*, vol. 145, no. February, p. 113519, Jun. 2021, doi: doi.org/10.1016/j.dss.2021.113519.

[5]   P. E. Hulme, "Unwelcome exchange: International trade as a direct and indirect driver of biological invasions worldwide," *One Earth*, vol. 4, no. 5, pp. 666–679, May 2021, doi: 10.1016/j.oneear.2021.04.015.

[6]   B. Cals, Y. Zhang, R. Dijkman, and C. van Dorst, "Solving the online batching problem using deep reinforcement learning," *Comput. Ind. Eng.*, vol. 156, no. March, p. 107221, Jun. 2021, doi: 10.1016/j.cie.2021.107221.

[7]   M. T. Ballestar, E. Camiña, Á. Díaz-Chao, and J. Torrent-Sellens, "Productivity and employment effects of digital complementarities," *J. Innov. Knowl.*, vol. 6, no. 3, pp. 177–190, Jul. 2021, doi: 10.1016/j.jik.2020.10.006.

[8]   I. Sanchez-Diaz, C. Altuntas Vural, and Á. Halldórsson, "Assessing the inequalities in access to online delivery services and the way COVID-19 pandemic affects marginalization," *Transp. Policy*, vol. 109, no. May, pp. 24–36, Aug. 2021, doi: 10.1016/j.tranpol.2021.05.007.

[9]   C. PENG, B. MA, and C. ZHANG, "Poverty alleviation through e-commerce: Village involvement and demonstration policies in rural China," *J. Integr. Agric.*, vol. 20, no. 4, pp. 998–1011, Apr. 2021, doi: 10.1016/S2095-3119(20)63422-0.

[10] H. Treiblmaier and C. Sillaber, "The impact of blockchain on e-commerce: A framework for salient research topics," *Electron. Commer. Res. Appl.*, vol. 48, no. April 2020, p. 101054, Jul. 2021, doi: 10.1016/j.elerap.2021.101054.

[11] M. Aparicio, C. J. Costa, and R. Moises, "Gamification and reputation: key determinants of e-commerce usage and repurchase intention," *Heliyon*, vol. 7, no. 3, p. e06383, Mar. 2021, doi: 10.1016/j.heliyon.2021.e06383.

[12] K. HAJI, "E-commerce development in rural and remote areas of BRICS countries," *J. Integr. Agric.*, vol. 20, no. 4, pp. 979–997, Apr. 2021, doi: 10.1016/S2095-3119(20)63451-7.

[13] D. Malhotra and O. Rishi, "An intelligent approach to design of E-Commerce metasearch and ranking system using next-generation big data analytics," *J. King Saud Univ. - Comput. Inf. Sci.*, vol. 33, no. 2, pp. 183–194, Feb. 2021, doi: 10.1016/j.jksuci.2018.02.015.

[14] W. Jun *et al.*, "Evaluation of precision marketing effectiveness of community e-commerce–An AISAS based model," *Sustain. Oper. Comput.*, vol. 2, no. April, pp. 200–205, 2021, doi: 10.1016/j.susoc.2021.07.007.

[15] M. Dobroselskyi, R. Madleňák, and D. Laitkep, "Analysis of return logistics in e-commerce companies on the example of the Slovak Republic," *Transp. Res. Procedia*, vol. 55, no. 2019, pp. 318–325, 2021, doi: 10.1016/j.trpro.2021.06.037.

[16] T. T. N. Nguyen, "Developing and validating five-construct model of customer satisfaction in beauty and cosmetic E-commerce," *Heliyon*, vol. 6, no. 9, p. e04887, Sep. 2020, doi: 10.1016/j.heliyon.2020.e04887.

[17] H. B. Rai, A. Cetinkaya, S. Verlinde, and C. Macharis, "How are consumers using collection points? Evidence from Brussels," *Transp. Res. Procedia*, vol. 46, no. 2019, pp. 53–60, 2020, doi: 10.1016/j.trpro.2020.03.163.

[18] M. Stinson, J. Auld, and A. (Kouros) Mohammadian, "A large-scale, agent-based simulation of metropolitan freight movements with passenger and freight market interactions," *Procedia Comput. Sci.*, vol. 170, pp. 771–778, 2020, doi: 10.1016/j.procs.2020.03.157.

[19] A. S. Tewari, "Generating Items Recommendations by Fusing Content and User-Item based Collaborative Filtering," *Procedia Comput. Sci.*, vol. 167, no. 2019, pp. 1934–1940, 2020, doi: 10.1016/j.procs.2020.03.215.

[20] N. Peña-García, I. Gil-Saura, A. Rodríguez-Orejuela, and J. R. Siqueira-Junior, "Purchase intention and purchase behavior online: A cross-cultural approach," *Heliyon*, vol. 6, no. 6, p. e04284, Jun. 2020, doi: 10.1016/j.heliyon.2020.e04284.

[21] S. T. Ponis, G. Plakas, K. Agalianos, E. Aretoulaki, S. P. Gayialis, and A. Andrianopoulos, "Augmented Reality and Gamification to Increase Productivity and Job Satisfaction in the Warehouse of the Future," *Procedia Manuf.*, vol. 51, no. 2020, pp. 1621–1628, 2020, doi: 10.1016/j.promfg.2020.10.226.

[22] M. Martínez-Domínguez and J. Mora-Rivera, "Internet adoption and usage patterns in rural Mexico," *Technol. Soc.*, vol. 60, no. June 2019, p. 101226, Feb. 2020, doi: 10.1016/j.techsoc.2019.101226.

[23] C. K. Upadhyay, G. A. Vasantha, V. Tiwari, V. Tiwari, and B. Pandiya, "Strategic upturn of reverse logistics with Crowdshipping: Transportation explication for India," *Transp. Res. Procedia*, vol. 48, no. 2018, pp. 247–259, 2020, doi: 10.1016/j.trpro.2020.08.019.

[24] G. Bertalero, A. Rosa, and B. D. Chiara, "Analysis of outsourcing conditions for freight transport and logistics among manufacturing companies: insights from a review of data and a field investigation," *Transp. Res. Procedia*, vol. 45, no. 2019, pp. 459–466, 2020, doi: 10.1016/j.trpro.2020.03.039.

[25] S. Rovetta, G. Suchacka, and F. Masulli, "Bot recognition in a Web store: An approach based on unsupervised learning," *J. Netw. Comput. Appl.*, vol. 157, no. February, p. 102577, May 2020, doi: 10.1016/j.jnca.2020.102577.

[26] Y. X. Liu and X. Y. Li, "Design and Implementation of a Business Platform System Based on Java," *Procedia Comput.*

Sci., vol. 166, pp. 150–153, 2020, doi: 10.1016/j.procs.2020.02.038.

[27] A. Gharehgozli and N. Zaerpour, "Robot scheduling for pod retrieval in a robotic mobile fulfillment system," *Transp. Res. Part E Logist. Transp. Rev.*, vol. 142, no. February, p. 102087, Oct. 2020, doi: 10.1016/j.tre.2020.102087.

[28] H. GU and C. WANG, "Impacts of the COVID-19 pandemic on vegetable production and countermeasures from an agricultural insurance perspective," *J. Integr. Agric.*, vol. 19, no. 12, pp. 2866–2876, Dec. 2020, doi: 10.1016/S2095-3119(20)63429-3.

[29] M. M. Chanda, G. Bandyopadhyay, and N. Banerjee, "Analysis and estimation of India's foreign exchange reserves using soft computing techniques," *IIMB Manag. Rev.*, vol. 32, no. 3, pp. 280–290, Sep. 2020, doi: 10.1016/j.iimb.2019.10.010.

[30] A. Rhiat, A. Aggoun, and R. Lachere, "Combining Mobile Robotics and Packing for Optimal deliveries," *Procedia Manuf.*, vol. 44, pp. 536–542, 2020, doi: 10.1016/j.promfg.2020.02.258.

[31] D. Gutt, J. Neumann, S. Zimmermann, D. Kundisch, and J. Chen, "Design of review systems – A strategic instrument to shape online reviewing behavior and economic outcomes," *J. Strateg. Inf. Syst.*, vol. 28, no. 2, pp. 104–117, Jun. 2019, doi: 10.1016/j.jsis.2019.01.004.

[32] P. Rita, T. Oliveira, and A. Farisa, "The impact of e-service quality and customer satisfaction on customer behavior in online shopping," *Heliyon*, vol. 5, no. 10, p. e02690, Oct. 2019, doi: 10.1016/j.heliyon.2019.e02690.

[33] A. Müller, S. Steins-Loeber, P. Trotzke, B. Vogel, E. Georgiadou, and M. de Zwaan, "Online shopping in treatment-seeking patients with buying-shopping disorder," *Compr. Psychiatry*, vol. 94, p. 152120, Oct. 2019, doi: 10.1016/j.comppsych.2019.152120.

[34] S. M. Cohen *et al.*, "FEMA GRAS assessment of natural flavor complexes: Citrus-derived flavoring ingredients," *Food Chem. Toxicol.*, vol. 124, no. November 2018, pp. 192–218, Feb. 2019, doi: 10.1016/j.fct.2018.11.052.

[35] A. P. Aristio, S. Supardi, R. A. Hendrawan, and A. A. Hidayat, "Analysis on Purchase Intention of Indonesian Backpacker in Accommodation Booking through Online Travel Agent," *Procedia Comput. Sci.*, vol. 161, pp. 885–893, 2019, doi: 10.1016/j.procs.2019.11.196.

[36] I.-S. Tsay and P.-H. Chen, "A dual market structure design for the reform of an independent power grid system—The case of Taiwan," *Energy Reports*, vol. 5, pp. 1603–1615, Nov. 2019, doi: 10.1016/j.egyr.2019.11.001.

[37] B. Bai, K. Zhao, and X. Li, "Application research of nano-storage materials in cold chain logistics of e-commerce fresh agricultural products," *Results Phys.*, vol. 13, no. December 2018, p. 102049, Jun. 2019, doi: 10.1016/j.rinp.2019.01.083.

[38] Q. Shen, J. Zhang, Y. Hou, J. Yu, and J. Hu, "Quality control of the agricultural products supply chain based on 'Internet +,'" *Inf. Process. Agric.*, vol. 5, no. 3, pp. 394–400, Sep. 2018, doi: 10.1016/j.inpa.2018.05.005.

[39] B. Bansal and S. Srivastava, "Sentiment classification of online consumer reviews using word vector representations," *Procedia Comput. Sci.*, vol. 132, pp. 1147–1153, 2018, doi: 10.1016/j.procs.2018.05.029.

[40] M. Iwashita, S. Tanimoto, and K. Tsuchiya, "Framework of highly secure transaction management for affiliate services of video advertising," *Procedia Comput. Sci.*, vol. 126, pp. 1802–1809, 2018, doi: 10.1016/j.procs.2018.08.097.

[41] P. Sulikowski, T. Zdziebko, D. Turzyński, and E. Kańtoch, "Human-website interaction monitoring in recommender systems," *Procedia Comput. Sci.*, vol. 126, pp. 1587–1596, 2018, doi: 10.1016/j.procs.2018.08.132.

[42] A. S. Tewari, J. P. Singh, and A. G. Barman, "Generating Top-N Items Recommendation Set Using Collaborative, Content Based Filtering and Rating Variance," *Procedia Comput. Sci.*, vol. 132, no. Iccids, pp. 1678–1684, 2018, doi: 10.1016/j.procs.2018.05.139.

[43] Y. Gao, D. Chang, T. Fang, and T. Luo, "The Correlation between Logistics Industry and Other Industries: An Evaluation of the Empirical Evidence from China," *Asian J. Shipp. Logist.*, vol. 34, no. 1, pp. 27–32, Mar. 2018, doi: 10.1016/j.ajsl.2018.03.004.