

Artificial Intelligence to Control the Consumption of Islamic Banking Customers

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ABSTRACT

This study aims to design the application of artificial intelligence technology in business functions, namely in the consumption function. This research method is a literature review by analyzing books and literature from various databases related to the research theme. The data used in this study is qualitative data from literature studies obtained from books and articles through various databases such as Scopus, Web of Science, Google Scholar, and other valid online sources to obtain research-themed material during March and April 2023. The use of mobile banking continues to increase. The features available in mobile banking provide comfort and convenience in making transactions. This can lead to consumption patterns that are not in accordance with the rules set out in Islamic law. Artificial intelligence technology can be applied in various business functions including production, distribution, procurement, and so on. In the consumption function, artificial intelligence can be designed to control consumption so that it conforms to Islamic principles, for example consuming halal goods, excessive amounts, and so on. The artificial intelligence technology adopted in mobile banking services is expected to become one of the monitoring tools to encourage Islamic banking customers to always commit to consumption rules, and prevent all forms of deviation from the correct consumption path.

Keywords: Mobile Banking, Islamic Consumption, Consumption Rules.

ABSTRAK

Penelitian ini bertujuan untuk merancang penerapan teknologi kecerdasan buatan pada fungsi bisnis yaitu pada fungsi konsumsi. Metode penelitian ini adalah tinjauan pustaka dengan cara menganalisis buku-buku dan literatur dari berbagai database yang berkaitan dengan tema penelitian. Data yang digunakan dalam penelitian ini adalah data kualitatif dari studi literatur yang diperoleh dari buku-buku dan artikel melalui berbagai database seperti Scopus, Web of Science, Google Scholar, dan sumber online valid lainnya untuk memperoleh materi bertema penelitian selama bulan Maret dan April 2023. Penggunaannya mobile banking terus meningkat. Fitur-fitur yang tersedia pada mobile banking memberikan kenyamanan dan kemudahan dalam bertransaksi. Hal ini dapat menimbulkan pola konsumsi yang tidak sesuai dengan aturan yang diatur dalam syariat Islam. Teknologi kecerdasan buatan dapat diterapkan di berbagai fungsi bisnis antara lain produksi, distribusi, pengadaan, dan lain sebagainya. Pada fungsi konsumsi, kecerdasan buatan dapat dirancang untuk mengendalikan konsumsi agar sesuai dengan prinsip Islam, misalnya mengonsumsi barang halal, dalam jumlah berlebihan, dan lain sebagainya. Teknologi kecerdasan buatan yang diadopsi dalam layanan mobile banking diharapkan menjadi salah satu alat pemantauan untuk mendorong nasabah perbankan syariah agar selalu berkomitmen terhadap aturan konsumsi, dan mencegah segala bentuk penyimpangan dari jalur konsumsi yang benar.

Kata Kunci: Perbankan Seluler, Konsumsi Syariah, Kaidah Konsumsi

Pendahuluan

The Islamic banking industry continues to digitize to align with technological advances in the current industrial revolution era. The development of technology and growing customer

expectations are driving new needs in the financial sector and digital transformation is essential to attract customers and increase the loyalty of existing customers (Machkour & Abriane, 2020). Digitization is a business process that is carried out through connectivity between objects (such as users, devices, and so on), infrastructure, and applications to gain better insight into problems and become options for organizational improvement (Scheer, 2019). Digital transformation is a process in which organizations must respond flexibly to changes in technological progress and the requirements of their customers in order to be competitive. It is also important to increase the efficiency of processes by using digital technologies, from which not only banks but also their customers can benefit (Stalmachova et al., 2022). Digitalization is the factor that most determines the level of service quality and customer satisfaction in today's digital era (Zouari & Abdelhedi, 2021).

Several research results show that digitalization has an impact on banking. Digitalization in the application of data mining is able to detect fraud, risk management, and Consumer Relationship Management (Hassani et al., 2018). Banking digitization affects financial results (Coryanata et al., 2023). The banking industry is one of the most fundamental industries that uses e-payment for financial transactions, as a convenience and speed of transactions (Alzoubi et al., 2022). Many research results discuss the impact of banking digitalization from a business perspective. However, not much has been described about the social impact on customers.

The policies of increasing social distancing and stay-at-home practices implemented by governments around the world during the Covid-19 pandemic have increased the use of mobile banking to manage business transactions. According to a June statement from the Federal Bureau of Investigation (FBI), mobile banking use has surged by 50% since the beginning of 2020 (Lake, 2020). Data on the use of online banking services in Egypt shows that 30 % increasing the use online banking from January 2020 to March 2020 and in End of 2020 and the increase will be 35% in the Middle East Region (Sigiili, 2020). In the UK, Online purchases made by supermarket customers, which usually account for less than a third of the total number of transactions each day, had reached 40.4% ahead of the government lockdown, before reaching 51.5% the day after on March 24 (Collinson, 2020). Additionally, The procedure of online payment for the purpose of online shopping is increasing the rate of sales as this method is very effective for people to save time and is a convenient way of making any payment and shopping (Alzoubi et al., 2022).

Even though people's lives are now starting to return to normal, it is believed that people still depend on the use of mobile banking for business transactions due to considerations of convenience and speed of transactions. This condition is likely to trigger people's consumptive behavior. Especially now that the halal market and Islamic consumption continue to increase (Karoui & Khemakhem, 2019);(Floren et al., 2020). Nowadays, the banking sector is at a new stage of its development, which is characterized by changes in consumer behavior, technology, and government regulation. One of the most significant trends in modern development is the widespread introduction of a digital economy, which leads to an increase in the quantity and quality of services in the banking sector. In such conditions, it becomes necessary to analyze the data that banking organizations have. That is why, at present, banks are increasingly resorting to the use of big data and artificial intelligence (AI) technologies (Yusupova et al., 2020). Today AI is more popular because it is powered by Big Data, advanced algorithms, and

increased computing and storage power. AI systems being elements embedded in digital systems make a huge impact on human decision-making (Duan et al., 2019). In Indonesia, Bank Syariah Indonesia implements a digital optimization strategy by strengthening the system, developing new features, cooperating with fintech, committing to continue to innovate in digital banking financial services, socializing and promoting branchless banking services, and conducting cross-selling in every transaction (Luthfiatussa et al., 2023).

Artificial Intelligence technology can be applied in various business functions including production, distribution, procurement, sales and marketing, accounting and finance, auditing, research and development, human resource management, and so on (Hasan, 2022). This study aims to complement the application of artificial intelligence technology in business functions, namely in the consumption function. This research provides insight into the concept of consumption according to Islamic views and how artificial intelligence technology should be used to apply this concept. In the future, artificial intelligence (AI) appears likely to influence marketing strategies, including business models, sales processes, and customer service options, as well as customer behaviors (Davenport et al., 2020).

Artificial intelligence is a computer that performs human cognitive tasks, particularly regarding learning and problem-solving (Baker et al., 2019). Massive and rapidly growing amounts of unstructured data, such as text, tweets, photos, video clips, and social media interactions, must have value. Such digital content can inform business decisions through artificial intelligence and computers that think and learn like humans (Williams, 2016). This study aims to complete literacy about the application of artificial intelligence technology in business functions, namely in the consumption function. The findings of this study are useful because they help practitioners and researchers to better understand the rules of consumption from an Islamic point of view and advance insights on how implementing artificial intelligence technology can control the consumption of Islamic bank customers through mobile banking.

Literature Review

Consumption as a form of human servitude to Allah

Islam is a universal and comprehensive religion. Universal means that Islam is intended for all mankind on earth and can be applied at any time and place until the end of time. Comprehensive means that Islam has complete and perfect teachings. The perfection of Islamic teachings is because Islam regulates all aspects of human life and not only spiritual aspects, but also muamalah aspects which include economic, social, political, legal, and so on (Hidayat, 2010).

Islam has an economic system that is fundamentally different from existing systems. Islam has roots in the Shari'a that shape the worldview as well as goals and strategies which are called maqasid asy-shari'ah. Maqasid ash-shari'ah contains everything that is needed by humans to realize happiness (falah) and good life (hayatan thayyibah). Imam Ghazali included all matters deemed important to protect and enrich faith, life, mind, lineage, and property in maqasid ash-shari'ah. Very wisely Imam Ghazali put faith in the first place in the maqasid list. Because from an Islamic perspective, faith is content that is very important for human happiness. It is faith that lays human relations on the right foundation, enabling human beings to interact with each

other in a balanced and mutually beneficial association in achieving mutual happiness (Chapra, 2006).

In Islamic economics, consumption is considered an obligatory means that a Muslim cannot ignore in realizing the goal desired by Allah Ta'ala in the creation of human beings, namely realizing full devotion only to Allah, as stated in QS. Adz Dzariyat: 56:

وَمَا خَلَقْتُ الْجِنَّ وَالْإِنْسَ إِلَّا لِيَعْبُدُونِ

And I did not create the jinn and mankind except to worship Me (Haritsi, 2006).

Thus, human behavior in consuming should be based on obedience. There are verses of the Quran and Hadis related to obedience, namely (Othman & Din, 2005):

QS. Al Hujurat: 13 :

يَا أَيُّهَا النَّاسُ إِنَّا خَلَقْنَاكُمْ مِنْ ذَكَرٍ وَأُنْثَىٰ وَجَعَلْنَاكُمْ شُعُوبًا وَقَبَائِلَ لِتَعَارَفُوا إِنَّ أَكْرَمَكُمْ عِنْدَ اللَّهِ أَتْقَاكُمْ إِنَّ اللَّهَ عَلِيمٌ خَبِيرٌ

O mankind, indeed We have created you from male and female and made you peoples and tribes that you may know one another. Indeed, the most noble of you in the sight of Allāh is the most righteous of you. Indeed, Allāh is Knowing and Aware.

QS. Al A'Raf: 96:

وَلَوْ أَنَّ أَهْلَ الْقُرَىٰ ءَامَنُوا وَأَتَّقَوْا لَفَتَحْنَا عَلَيْهِم بَرَكَاتٍ مِّنَ السَّمَاءِ وَالْأَرْضِ وَلَٰكِن كَذَّبُوا فَأَخَذْنَاهُم بِمَا كَانُوا يَكْسِبُونَ

And if only the people of the cities had believed and feared Allāh, We would have opened [i.e., bestowed] upon them blessings from the heaven and the earth; but they denied [the messengers], so We seized them for what they were earning.

Rasulullah sallallahu 'alaihi wa sallam said:

I leave among you two things that you will not go astray as long as you stick to both, namely the Book of Allah and the Sunnah of His Messenger (Mursal Hadith of Imam Malik, Al-Tibrizi in Misykat al-Masabih Volume I, Kitab al-Iman, chapter al-Itisam bi al-Kitab wa al-Sunnah, Hadith no. 179)

Urgency And Consumption Rules

According to Haritsi (2006) Consumption has enormous urgency in every economy because there is no human life without consumption. Therefore, the economy leads to the fulfillment of consumer demands for humans. Muslim consumers should be committed to the rules and laws conveyed in the Shari'a to regulate consumption in order to achieve optimal consumption benefits, and prevent deviation from the path of truth and the harmful effects,

both for themselves and others. The following is the rule of consumption in Umar Radhiyallahu Anhu's fiqh.

1. Sharia principles, cover three areas, namely the principles of faith, scientific principles and practical principles. The rule of faith is knowing the nature of consumption as a means used by a Muslim in obeying Allah Ta'ala. Scientific Rules, namely a Muslim must know the sharia laws relating to what he consumes. Meanwhile, the amaliyah rule is how to implement the two previous creeds, namely by paying attention to the form of goods consumed.
2. The Rule of Quantity, pays attention to sharia limits, for example simplicity, compatibility between consumption and income, and so on.
3. Pay attention to economic priorities. namely paying attention to the level of types of goods consumed consisting of primary, secondary and tertiary.
4. Social Rules, namely knowing the social factors that influence the quantity and quality of consumption.
5. Environmental Rules. The environment has a major influence on consumption behavior. Because of this, changes in consumption patterns often occur due to changes in the environment, and the factors that influence these consumption patterns can be both material and non-material.
6. Prohibition of following and imitating, a Muslim is prohibited from following bad consumptive patterns, both for Muslims and for unbelievers, for example hedonic and consumptive behavior

Empirical Analysis of Existing Research on Mobile Banking embeds Good Manners and Artificial Intelligence

This section describes how explains how mobile banking is adopted by Islamic banks. Research on exploring a consumption value model for Islamic mobile banking adoption to further investigate how consumers' perceived values such as embedded functional, emotional, epistemic, conditional, and social values influence the use of Islamic mobile banking. The results of this study indicate that when consumers are treated as a homogeneous group, the factors that most influence behavioral intention to use Islamic mobile banking services are social, functional, epistemic and emotional factors. Overall, when comparing Muslims and non-Muslims, two models are formed. In the Muslim model, the conditional value factor is not significant and does not affect Muslim consumers. Muslim consumers seem to treat situational concerns, mobile device usage and time pressure as less important than other factors. Conversely, conditional factors are important in the non-Muslim model (Goh et al., 2014).

Next is research on the impact of service needs, service quality, attitudes towards artificial intelligence, relative advantage, security in certain mobile banking activities, perceived trust, and religiosity towards the use of mobile banking and the use of AI embedded in mobile banking. The need for service refers to the perception of an individual's need to interact with bank employees at any point along the customer's path to transact. The respondents in this study are the millennial generation. The results of the study show that attitudes, beliefs, and religiosity are the main determinants that influence the millennial generation to use the two service models offered by Islamic banks. It can be said that the comfort they feel when interacting with technology has driven their attitude to use the service (Yussaivi et al., 2021).

Next is research to test the adoption of mobile banking in Islamic banks by integrating the technology adoption model (TAM) and the Religiosity Behavior Intention Model. Findings The results of this study reveal that the integration of the TAM and Religiosity-Intention models provides a more complete explanation of mobile banking adoption by Islamic bank consumers. In addition to perceived benefits and perceived ease of use, the results of this study emphasize the importance of religiosity in mobile banking adoption. To increase the adoption of mobile banking services, Islamic banks not only provide useful and easy-to-use applications but also consider the religiosity of customers. All their mobile banking marketing strategies should focus on providing high quality mobile services while ensuring bank operations comply with Islamic law (Suhartanto et al., 2020).

Research Method

This research is qualitative research that tries to do a thorough analysis of various kind of literature. The data collection method used in this research is literature study and observation. The steps in conducting a literature study are searching for books and articles through various databases such as Scopus, Web of Science, Google Scholar, and other valid online sources to obtain research-themed material during March and April 2023. The keywords used are artificial intelligence, machine learning, mobile banking, Islamic consumption, and Islamic economics. The use of these keywords is intended so that the articles obtained are more closely related to the research theme, namely consumption and artificial intelligence so that searches are more efficient and effective.

Then, to gain a more complete understanding of the potential application of artificial intelligence technology, we made observations by exploring the mobile banking features of two Islamic banks, namely Bank Syariah Indonesia (BSI) and Bank Muamalat Indonesia during March and April 2023. The choice of BSI was because the bank received an award as The Strongest Islamic Retail Bank in Indonesia at the 8th Islamic Retail Banking Awards (IRBA) 2022 in Jakarta. This award was decided based on the global ranking of Islamic banks, which was conducted by the Cambridge Institute of Islamic Finance (CIIF) which measures the performance of 130 Islamic banks worldwide (BSI, 2022). Meanwhile, the choice of Bank Muamalat was because this bank is the first Islamic bank in Indonesia and has just won an award as The Best Bank in Digital Services at the 2022 TEMPO Financial Award (TFA) event (Muamalat, 2022). We then conduct an empirical analysis of selected literature based on consumption principles to generate many insights. Based on this analysis, we then choose which consumer behavior can be controlled through artificial intelligence. By taking a closer look into Islamic consumption literature and artificial intelligence technology, some confusion and ambiguity can be clearly detected (Karoui & Khemakhem, 2019).

Result and Discussion

Sharia Consumption Behaviour

In this section, we compile the rules of consumption according to Islamic views from various kinds of literature. We are only limited to the rules that Islamic banks may be able to maintain

Table 1. Rules of Consumption

No	Consumption Rules	Implementation Form	References
1	Sharia Principles	consume what is lawful and stay away from what is unlawful and doubtful	Quran Al Baqarah: 172
2	Rule of Quantity	Good enough, not excessive, midway between extravagant and stingy, limiting the amount of consumption (consumption amount should not harm the amount of storage), Match between consumption and income	- Quran Al Araf: 31 - Quran Al Isra': 26-27 - At-Tirmidzi, As Sunan, Hadist number 2380 - Ibnu Majah, As Sunan, Hadist number 3349 - (Haritsi, 2006) - (Alam et al., 2011) - (Khan, 2020)
3	Pay attention to economic priorities	Consumption level (primary, secondary, tertiary)	- (Haritsi, 2006) - (Furqon, 2018)
4	Social Rules	no harm to other people and the environment	- (Haritsi, 2006)
5	Environmental Rules	attention to environmental factors that impact on consumption patterns	- (Haritsi, 2006)
6	Prohibition of following and imitating	hedonic and consumptive behavior	- (Haritsi, 2006) - (Furqon, 2018)

Focus Area of Artificial Intelligence

Before discussing how artificial intelligence technology can be applied in controlling the consumption of Islamic bank customers, we need to know how artificial intelligence works. The Business Intelligence (BI) System has four main components namely the Data Warehouse, with its source data; business analytics, with a collection of tools for manipulating, mining and analyzing data in the Data Warehouse; Business Performance Management to monitor and analyze performance; and user interfaces (for example, dashboards). BI systems are starting to include artificial intelligence capabilities as well as strong analytical capabilities. Artificial intelligence is a subfield of computer science concerned with symbolic reasoning and is used for problem-solving (Sharda et al., 2018). Artificial intelligence and machine learning are cognitive businesses that use structured and unstructured data and highly sophisticated analytical techniques to identify, evaluate and recommend business actions (Williams, 2016).

The Widespread use of AI in society is still in its very early stages. This is partly due to the costs associated with adopting the required technology as well as a lack of technical know-how within the company (Chukwuani & Egiyi, 2020). The biggest challenge in initiating AI is the integration of existing systems and business processes. However, artificial intelligence can

be seen from various perspectives, namely intelligence, business, research and programming dimensions. Artificial intelligence is a device that can be programmed to act as expected by humans. Artificial intelligence is widely used to carry out formal tasks such as mathematics and games, perception tasks and robotics to expert tasks such as financial analysis, medical diagnosis, scientific analysis and other task areas. With the available knowledge, artificial intelligence is expert in solving various problems. From a business perspective, this artificial intelligence is very powerful, and its methodology is used as a tool to solve various business problems (Brown & O'leary, 1995). Every large company should be exploring cognitive technologies. With the right planning and development, cognitive technology could usher in a golden age of productivity, work satisfaction and prosperity (Davenport & Ronanki, 2018).

How Artificial Intelligence Fits Controlling Consumption Through Mobile Banking

Individuals are often weak in realizing self-control commitments. This is what requires the need for external supervision carried out by other parties to encourage individuals to always be committed to consumption rules, and prevent all forms of deviation from the correct consumption path. The supervision carried out by Islamic banking on its consumers is only limited to an appeal designed into artificial intelligence technology adopted through mobile banking. Based on the results of our exploration of Bank Syariah Indonesia and Bank Muamalat mobile banking, there are features that have the potential to adopt artificial intelligence technology, including:

- Integration with e-commerce.

This feature allows customers to make payments for purchases of goods made through e-commerce applications.

- available payment for public services such as education, electricity, tickets, and so on.

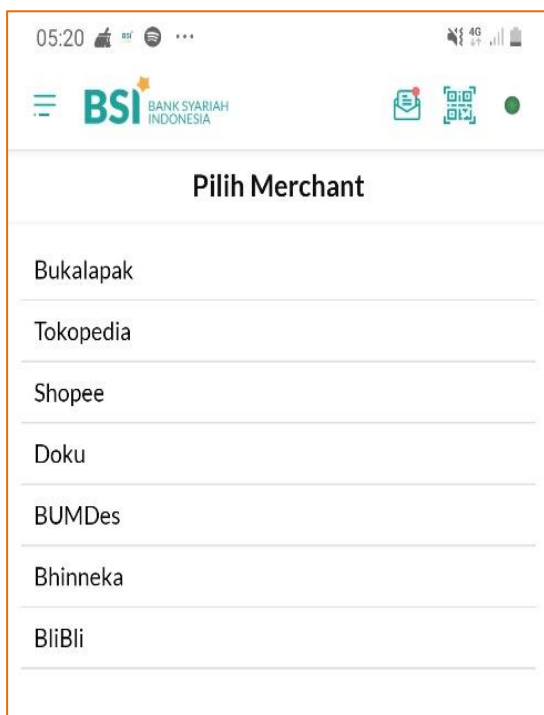


Figure 1. Integration with e-commerce

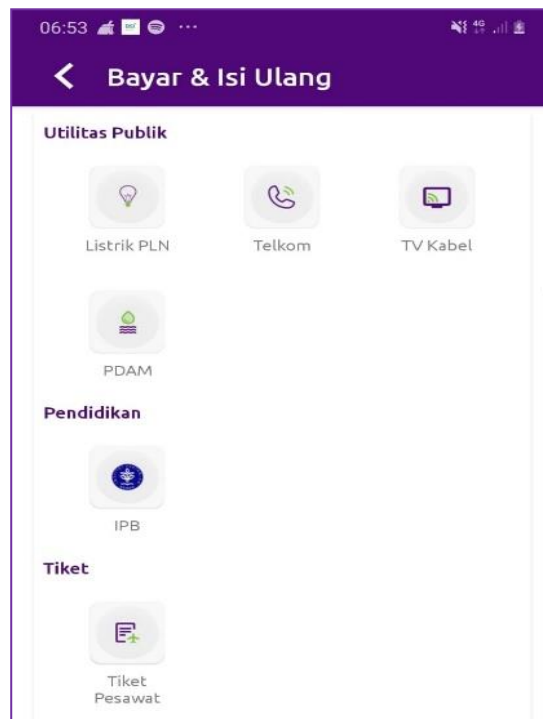


Figure 2. Payment of Public Service

Artificial intelligence technology can be implemented in Islamic banking mobile banking, especially to control customer consumption. Some of them are:

1. Mobile banking that is integrated with e-commerce, when customers make payments, they can add the following features:
 - a. The payment process cannot be made if there is a purchase of goods that are unlawful for consumption and traded. Currently, this feature only displays the number of purchase payments. Does not display details of the items purchased by the customer. Mobile banking that has been integrated with e-commerce can of course access detailed data about what items customers buy. When items that are prohibited according to Islamic sharia are found, before the payment process is carried out, mobile banking needs to display a warning that there are items that are prohibited from being purchased.
 - b. compare the amount of transaction payments with customer deposit balances. If the ratio is in a certain amount, for example, more than 50%, mobile banking issues a warning so that customers need to consider payments that may be considered excessive consumption.
 - c. display payment options with the sharia buying and selling schemes (eg murabahah) which is equipped with a margin calculation for each item purchased if there are goods for secondary or tertiary needs.
 - d. adds a feature to offer sharia buying and selling schemes (murabahah) when customers make purchases amount can jeopardize their savings balance.

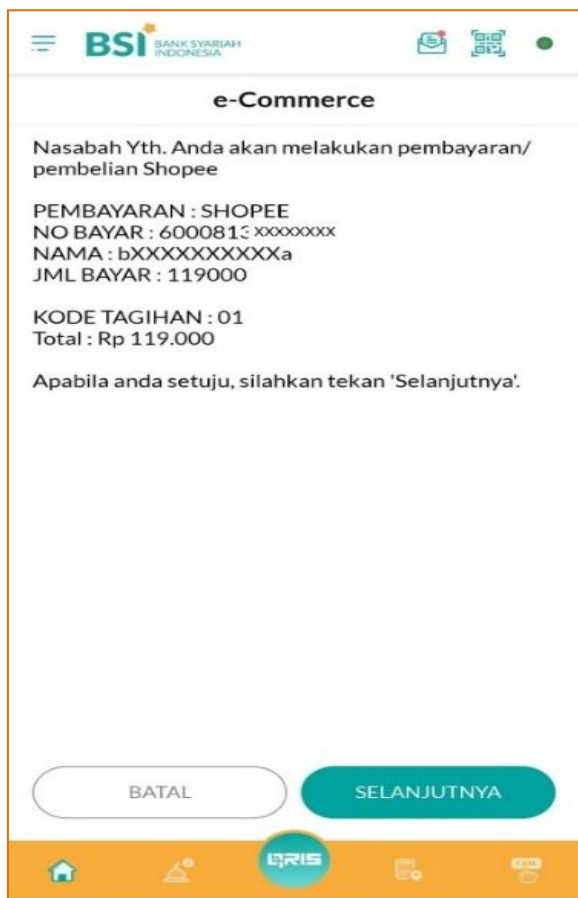


Figure 3. E-commerce Transaction



Figure 4. Design of Warning for Large Expenses

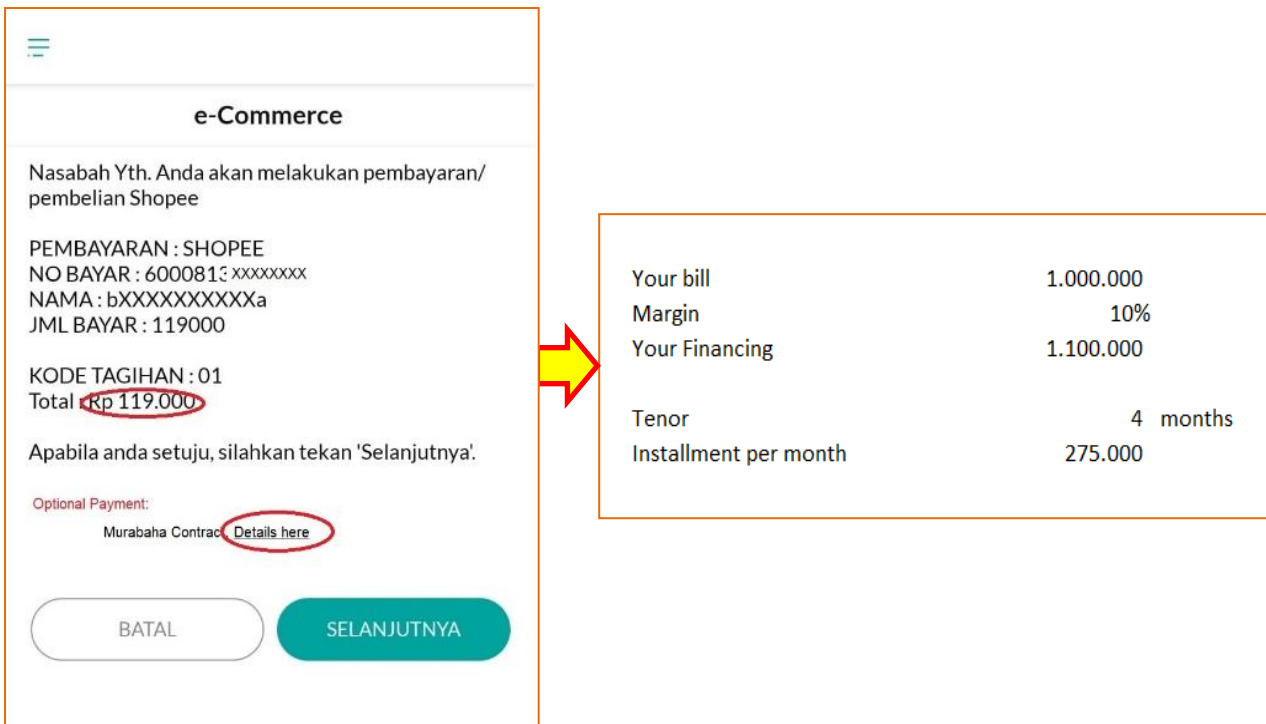


Figure 5. Design of Murabaha Contract as Optional Payment for Secondary/Tertiary Needs or Amount can Jeopardize Savings Balance

2. Mobile banking that provides payment public services, for example education fees plus sharia financing options (eg multi-service ijarah) is equipped with calculations. Multi-service financing in the general provisions of the Fatwa of the National Sharia Council No.44/DSN-MUI/VIII/2004 is legally permissible (jaiz) by using an Ijarah or Kafalah contract. Al-Ijarah Multijasa financing is provided in the form of services for education costs, health costs, marriage costs, paying taxes and for financing debt payments (Hayati, 2014).

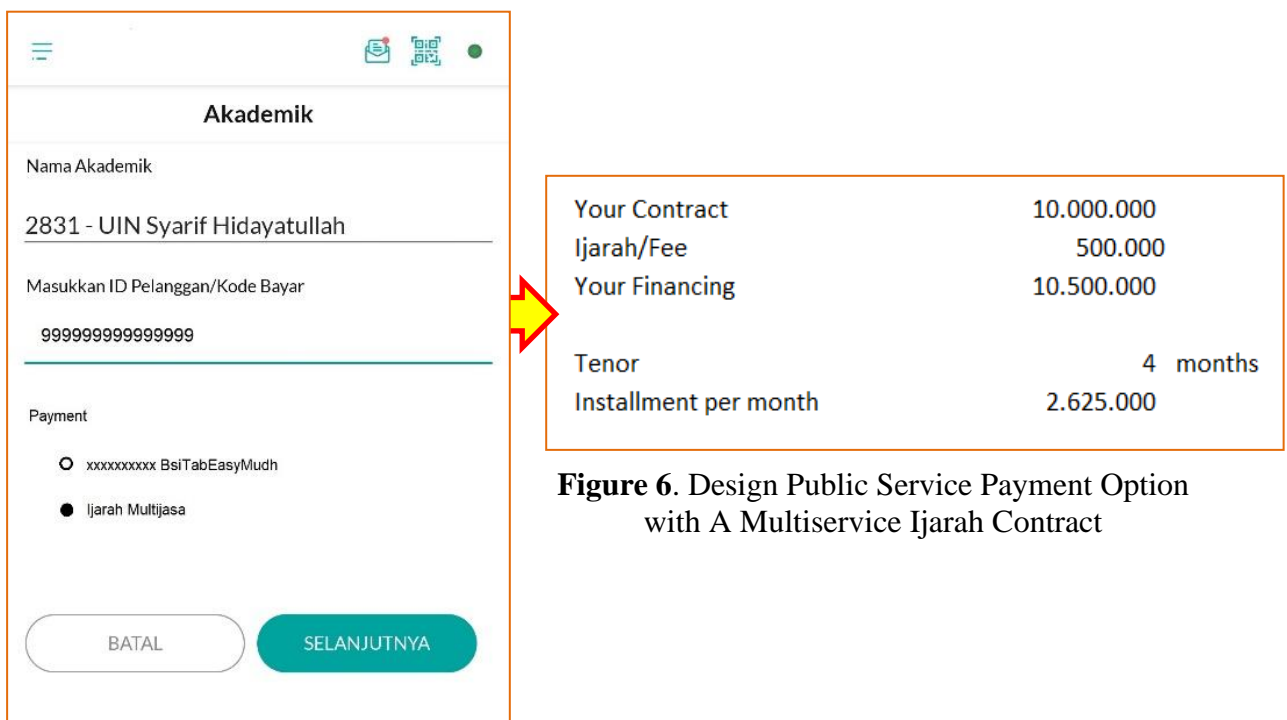


Figure 6. Design Public Service Payment Option with A Multiservice Ijarah Contract

Conclusion

The Muslim consumer will be closer to the correct consumption line if he is more committed to the consumption rules. Consumption rules that must be guided by Muslim consumers include sharia principles, rule of quantity, pay attention to economic priorities, social rules, environmental rules, and prohibition of following and imitating. Islamic banking can apply artificial intelligence technology to control customer consumption, for example comparing the number of payment transactions with the balance of customer deposits. In certain ratios that are considered excessive consumption, mobile banking issues a warning so that customers need to consider the payment. Apart from that mobile banking needs to consider adding a feature to offer sharia buying and selling schemes when customers make purchases of goods for secondary or tertiary needs or when the purchase amount can jeopardize their savings balance.

Referensi

Referensi memuat daftar bacaan yang diacu dalam naskah. Referensi yang dijadikan acuan paling lama 5 (lima) tahun terakhir dari tahun Naskah ditulis. Kutipan yang berasal dari tulisan sendiri dibatasi paling banyak 30% dari total jumlah kutipan (Daftar Pustaka). Jumlah sumber acuan daftar pustaka paling sedikit 10 (sepuluh) dan acuan primer dianjurkan paling sedikit 80% dari total acuan dan bersumber dari jurnal. Referensi ditulis dengan metode penulisan kepustakaan (*American Psychological Association (APA)*), dengan huruf Times 12pt spasi 1 dengan before 6pt dan after 0pt. Untuk mempermudah dalam sitasi disarankan menggunakan referensi manager seperti endnote, zatro, dan atau mendeley.

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