

The Effects of the Covid-19 Pandemic on Big Data Artificial Intelligence

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Submitted: January-February 2023, Revised: March 22 2023, Accepted: May 23, 2023

ABSTRACT

The Covid-19 pandemic has changed people's behavior. Artificial Intelligence is made based on big data of people's behavior. Financial institutions use AI in making credit decisions. The AI basis of credit decisions is made based on existing customer Big Data. This customer's Big Data has changed as a result of the Covid-19 pandemic. Changes in Big Data mean that the AI of financial institutions in decision making must be adapted to the new behavior. This study aims to discuss the changing community behavior variables related to the granting of credit approvals. This study uses a qualitative method with a literature review. This study concludes that length of stay, home ownership, occupation, length of work, expense ratio, age, bank account, awareness of fintech, usage of fintech and demographic variables have changed. These variables need to be adjusted as a result of changes in the behavior of the Covid-19 pandemic.

INTRODUCTION

The social restriction policy due to the Covid-19 pandemic has allegedly changed people's behavior patterns. Before the Covid-19 pandemic, people were doing normal activities outside their homes. Community activities after the emergence of the Covid-19 virus have changed a lot. Technology has taken an important role in human life [1]. The issue of New Normal has been known during the Covid-19 pandemic. Changes in behavior regarding healthy living behavior, behavior using technology, behavior in education, behavior using social media, consumptive behavior, work behavior and social security behavior [2].

Changes in people's behavior before and during the pandemic experienced significant changes. Internet penetration in Indonesia rose from 55% in 2019 to 73.7% in 2020. The most striking change in behavior is that society is becoming more digital [3]. In addition to changes in digital behavior, the community has a change in the behavior of people who live healthier lives. Adoption of health protocols has become a new culture of society [4].

Changes in people's behavior as a result of the Covid-19 pandemic have resulted in changes in many things. One of them is big data (BD) which is used as the basis for making Artificial Intelligence (AI). Big data previously took data from normal behavior into new normal activities.

Work from home behavior has changed the retrieval of one's office location data. Before the pandemic, we could take the position of a person in a location from 08.00 – 17.00. We can match the location of the global positioning system (GPS) with the location of the office address. We can assume that the location of a person in a certain time reflects a certain location. If someone is in a location between the hours of 19.00 – 05.00, then this is the location where he lives. We can verify the home address with the GPS position. With work from home, one can work from home without the need to go to the office.

This study aims to compare changes in people's behavior between before and after the Covid-19 pandemic. This change in behavior laid the foundation for the BD change for AI. Discussion on this matter is still very rare. This study conducted literature research compared to changes in human behavior with the literature as well. Changes in human behavior are based on monitoring community behavior and the regulations applied.

A criticism of the use of AI is the reliance on big data. This raises several problems, especially in the financial sector, so we are familiar with the term "The world's most valuable resources is no longer oil, but data". The use of AI in financial institutions is in the decision-making process. Decisions do not depend on human subjectivity, but on the system [5]. However, this AI works without human intervention and humanity's moral interests [6]. AI needs data. The financial industry has data that is growing rapidly. AI is used for voice recognition, position tracking and interpretation of human movement [7].

The use of AI has faced challenges in line with the occurrence of the Covid-19 Pandemic. Economic growth has slowed after the pandemic has made AI development slower [8]. Prior to the Covid-19 pandemic, AI was used to increase global productivity, balance and inclusion, and a better environment and other things in the short and long term. [9].

The Covid-19 pandemic has affected human life psychologically and behaviorally [10]. Changes in consumptive behavior can be grouped into four things, namely the purpose of consumption, differences in factors that influence consumptive behavior, media and transaction tools. One of the behavioral changes is that conventional payments have turned into digital payments during the Covid-19 pandemic [11]. Overall, the number of public expenditures has also decreased during the Covid-19 pandemic [12]. Society has the ability to adapt to the Covid-19 pandemic. Public spending has decreased with a focus on urgent needs [13].

During the Covid-19 pandemic, consumers have a value-focused behavior, shopping online, and shopping for health-focused products and services [14]. Changes in Clean and Healthy Life Behavior (PHBS) also increased after the Covid-19 pandemic compared to before the pandemic [15]. The government's policy that requires the use of masks, hand sanitizers, liquid soap, tissues and personal eating utensils, personal worship utensils and using their own helmets are public health behaviors during a pandemic. This behavior shows awareness of PHBS [16].

The government has forced new behavior on the people. Financial literacy is one of the preventive measures against disasters such as pandemics, especially panic buying at the beginning of the pandemic [17].

During the pandemic, the business world also experienced a decline in income [18]. This decrease in income results in a decrease in people's welfare. An increase in unemployment, a decrease in per capita income and an increase in poverty rates have occurred. The pandemic has resulted in changes in the financial management of employees. Employees are more diligent in saving and prioritizing needs over wants [19].

On the other hand, the pandemic has also resulted in an increase in online shopping. Online shopping has increased income for e-commerce players. Apart from e-commerce, another industry that is experiencing an increase in revenue is the pharmaceutical industry [20]. One way for MSMEs to adopt new behaviors is to adopt digitalization [21].

This study has the following research questions: what AI variables have changed due to the Covid-19 pandemic? The discussion of this research is about each variable that changes as a result of the Covid-19 pandemic. This change is based on a literature study.

RESEARCH METHOD

This research uses qualitative research methods. Qualitative research is based on practical experience or action research combined with case studies. This study aims to discuss the implications of the Covid-19 pandemic on AI changes. This AI change is based on a review of the literature and the practical experience of experts. This research can be categorized as action research associated with a case study. Action research is carried out by directly studying the implementation and improvements made. Case studies are useful methods when verifying or expanding well-known theories or challenging a specific theory [22]. The qualitative method allows the researcher to explore and better understand the complexity of a phenomenon. Obviously, the qualitative research is more complex than the quantitative research, as it deals with human mind and actions [23]. The results of this study provide solutions for financial companies to revisit big data AI. This research provides the basis for changes in consumer behavior due to the Covid-19 pandemic. This change provides an explanation for business people to change big data AI.

This study conducts a literature review and review of consumer behavior and is associated with the variables in forming AI. Action research is an emergent inquiry process that integrates theory and action to couple scientific knowledge with existing organizational knowledge and to address real organizational problems together with the people of the system under inquiry. It has a complex history, because it is not a single academic discipline; but an approach to research that has emerged over time from a broad range of fields [24]. It is a type of qualitative research that seeks action to improve practice and study the effects of the action that was taken.

A qualitative method based on a literature study is carried out by considering the conditions of the Covid-19 pandemic that is still ongoing in 2022. Validity testing can be carried out after several months of the end of the Covid-19 pandemic. Test data requires customer data in default and in full. Thus, this research was conducted qualitatively. The explanation of the

research framework is described in Figure 1.

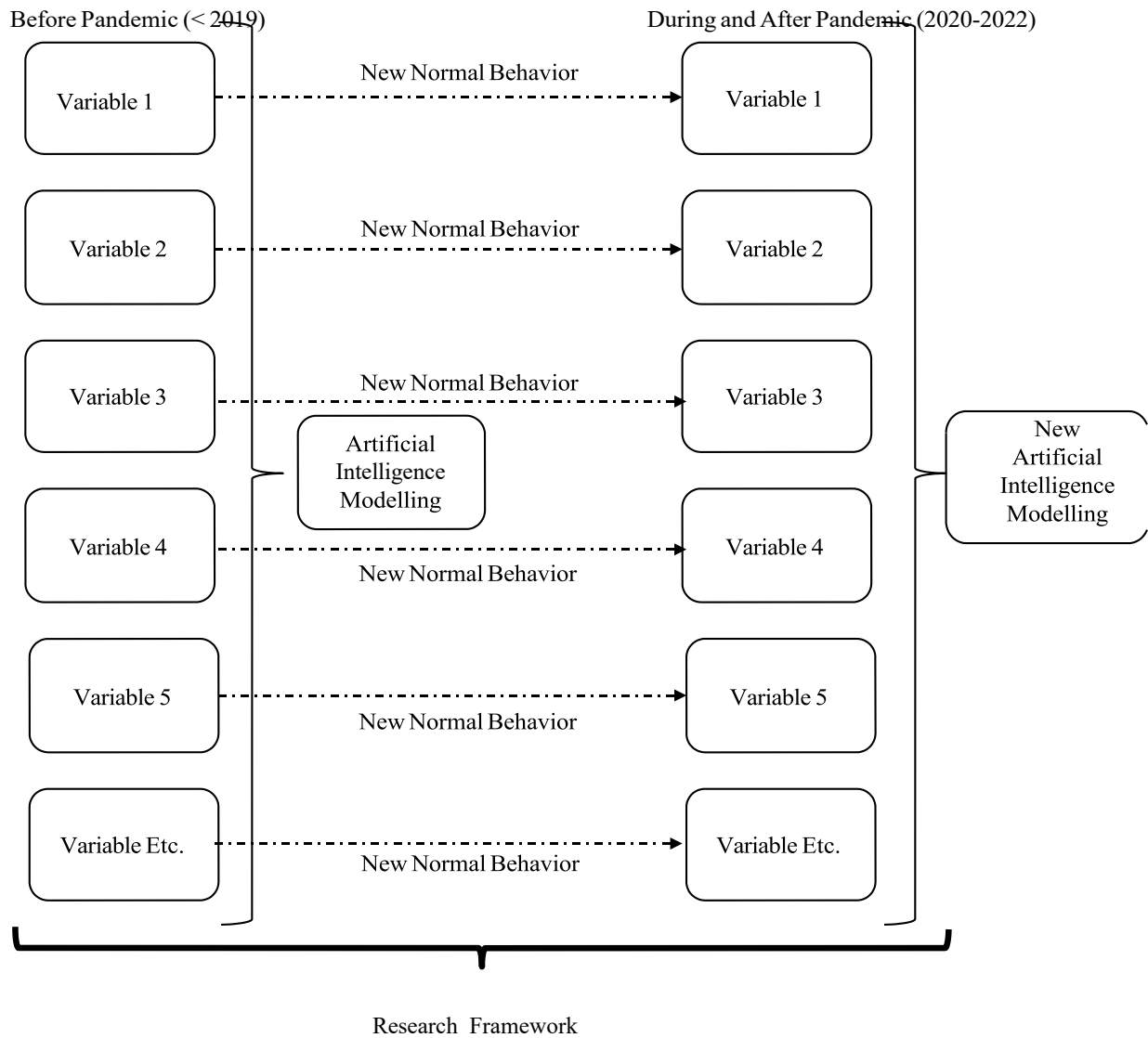


Figure 1 Research Framework

DISCUSSION

Financial AI Variables That Change Due To The Covid-19 Pandemic

Based on research by Johan (2017, 2018) that the following variables are variables that have an influence on credit decisions of financial institutions. This study concludes that these variables have changed as a result of the Covid-19 pandemic. Presentation of changes in table 1 and table 2.

Table 1 Credit Decision Variables

Variable in Credit	Average Before	After Pandemic	Source
Length of Stay	Between 5 – 6 Years	The period of stay will change along with changes in work patterns after the pandemic, where many people work from home, and don't need to be close to the office location	[27]–[29]
Home Ownership	50% Owned	Along with the needs of the workplace, home ownership will change.	[27]–[29]
Occupation	Self Employed	The number of layoffs during the pandemic, so many workers will move from workers to entrepreneurs.	[30], [31]
Length of work	5 Year	Length of service will also change along with termination of employment.	[28], [3]
Expense Ratio	45%	Changes in spending through online and necessities alone, will change the ratio of costs	[33]
Age	37 Years	The age of the customer may also change along with the number of deaths in humans over the age	[34]

During and after the pandemic, many companies provide work from home opportunities. With this policy, the employee's residence and home ownership will change along with this policy. Employees will choose a residence that can work life balance. Before the pandemic, look for a place to live near the office. With this new residence, home ownership can also change. The results of this discussion are supported by Mungkasa (2020); Thomason & Williams, (2020); Rubin, Nikolaeva, Nello-Deakin, & Brommelstroet (2020).

Many companies have terminated their employment due to the decline in company revenues. With the termination of employment, the length of work and occupation will change. Many office workers turn into e-commerce entrepreneurs. This is in line with the research results Khairi, Irawan, & Astuti (2021), Thomason & Williams (2020) dan Achiel, Soffy, Eka, & Kumaya (2020).

Age is one of the main factors that need to be adjusted. The Covid pandemic has lasted for two and a half years, so the pattern of customers in 2019 has grown older. This is in line with Fuadi & Irdalisa (2020), which states that the pandemic has lasted more than two years. On the other hand, based on research Johan (2021) Regarding the variables that affect the use of P2P Lending, it can be concluded that the variables of using conventional banks, awareness of financial technology, use of financial technology and demographic variables change.

Table 2 P2P Lending Variables

Variable	Average Before	After Pandemic	Source
Bank Account	0,95	The use of banks as a means of payment has turned into a digital payment instrument	[36]–[39]
Awareness of Fintech	0,72	Technological developments during the Pandemic have increased people's knowledge of financial technology.	[40], [41]
Usage of Fintech	0,10	Technological developments during the Pandemic have increased people's knowledge of financial technology.	[40], [41]
Demographic Variables (Age)	Millennial and Generation X	The age of customers regarding financial technology will change with the experience of almost three years of the pandemic.	[42], [43]
Demographic Variables (Income)	Income IDR 5.000.000 – 10.000.000/mo	Customer income will change due to job loss, company savings and company efficiency.	[44], [45]

Changes in digital payments since the Covid-19 pandemic have replaced traditional payments through banks. This has been researched by Aulia, (2020b); Primadineska (2021); Simatupang & Siska (2021); Nizar & Sholeh, (2021). With the use of digital financial institutions, people are aware of technology financial institutions and use financial technology. The use of peer to peer lending has increased during the pandemic. This is supported by research Adirinekso (2021); Riady, Soemitra, Nawawi, Islam, & Sumatera (2022).

Changes in the behavior of generations after the pandemic in line with changes in age also affect big data technology financial institutions. This is in line with the news information by Sari (2022) dan CNBC Indonesia (2022). The age of the customer has changed and the generation of decision-making using financial technology has also changed.

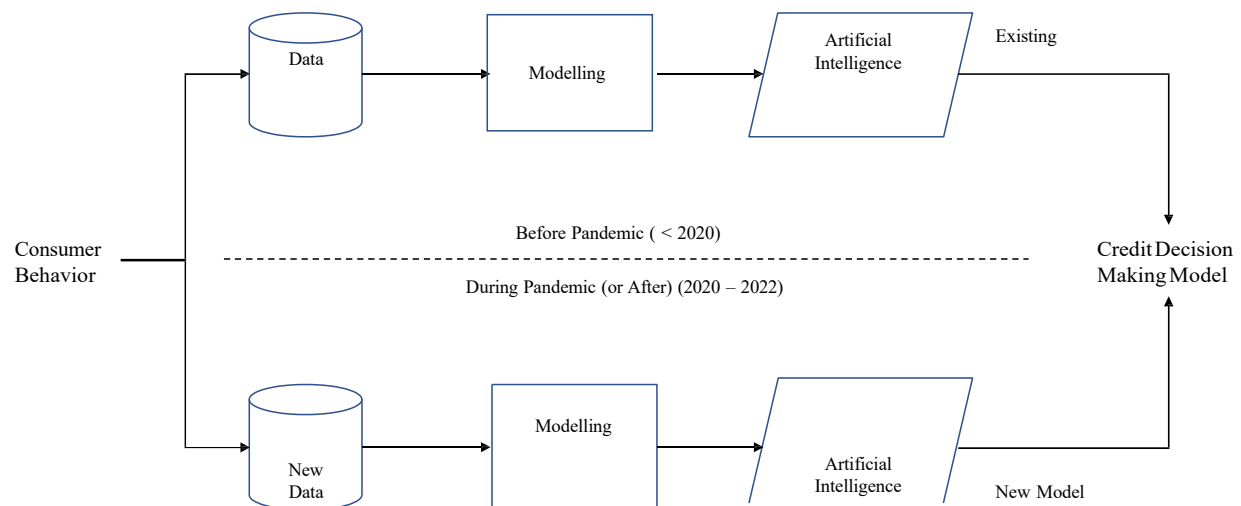


Figure 2 Big Data to Artificial Intelligence

The income of customers who borrow peer to peer lending has also changed. This is in line with changes in consumer behavior. Consumers save more and focus on living needs. This is in line with research by Sampe & Dongoran, (2021) dan Solih (2022).

Based on the research above, AI that used big data before the Covid-19 pandemic needed to be adjusted. These big data adjustments need to change the entire data structure. New data cannot be added, but needs to be replaced. This significant change in behavior patterns should be adapted to AI. An overview of this model change is depicted in Figure 1.

CONCLUSION

The Covid-19 pandemic has resulted in changes in consumer behavior. This change in behavior results in a change in big data. Big data is the source of artificial intelligence. So this AI must adapt to changes due to the Covid- 19 pandemic. Financial institutions have used big data to build AI for credit decisions. Credit decision variables, including length of stay, home ownership, occupation, length of work, expense ratio, age, bank account, awareness of fintech, usage of fintech and demographic variables have changed. So AI needs to adjust to these variables. This study has shortcomings with a qualitative discussion. Research by testing the validity of these variables needs to be done again. However, due to limited time, where the Covid-19 pandemic is still ongoing in 2022, the validity test requires a longer time.

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