Big Data and Internet of Behaviors (IoB): Its Nature and Importance in the World of KYC

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Abstract: *With rapid digitalization, a novel concept called "Internet of Behaviors" (IoB) is emerging, where businesses can leverage large data gathered through IoT as a tool to affect people's actions. By the end of 2025, more than half of the world's population, according to Gartner, will be enrolled in the IoB program. The research below identifies how the Internet of Behaviors (IoB) can be integrated and used to change the world of KYC (Know Your Customer). The analysis identifies that KYC is a critical process, especially in finance. Financial organizations can use KYC to effectively manage the funds they receive by protecting the market from money obtained through fraud. The theoretical foundation shows that the research follows the TAM model. IoT, People, and IoE are identified as critical external factors that influence the way IoB can change the world of KYC. The study comes to the conclusion that KYC is directly impacted by IoB through the massive big data it gathers, which has a substantial impact on success in many modern firms.*

Keywords: IoB, IoT, IoE, KYC, Big Data, B2C business model, TAM, Integrity.

Introduction

Internet of Behaviors (IoB) has emerged as a new concept that promotes the influence of people's behavior through massive data collected through Internet of Things devices. IoB has been identified as an even more critical technology to describe consumer behavior (Xiang et al., 2015). Using data collected from various IoT devices will help organizations better predict consumer behavior (Lemon & Verhoef, 2016). The new trend has been very interesting to companies that engage in B2C business models because they can use the data to influence their consumers better, promoting their sales and boosting their growth (Li & Chung, 2006).

IoT devices are increasingly being adopted across the world today (Dash & Swayamsiddha, 2020). The increase in efficiency within the Internet has significantly contributed to the number of devices used today. 5G, the latest network technology, is also expected to boost the number of devices even more. The field of IoT is expected to grow with the increased development of network infrastructures (Khodadadi et al., 2016). The IoT sector, in turn, enables the Internet, sensors, and processes to be interconnected and rely on each other for data analysis (Dash & Sharma, 2021). Internet of Behavior has been introduced as a new concept that integrates the IoT's impact on information and utilizes this information to be knowledge and wisdom about consumers.

The image below identifies the shift from data to information to knowledge and wisdom necessary in IoB. Figure 1 shows that IoB is reliant on IoT for information. The world of KYC describes the concept of Know Your Customer. KYC is a critical process for most industries today. Banks and financial organizations have especially befitted from KYC because it helps them avoid scenarios of fraud and illegal customer activities (Lemon & Verhoef, 2016). KYC has, therefore, been an effective tool for promoting risk assessment in banks and other financial institutions. KYC systems must be top of the line to ensure that organizations are protected from fraudulent activities

(Kapsoulis et al., 2020). More systems continue to be developed daily to ensure that financial institutions remain protected.

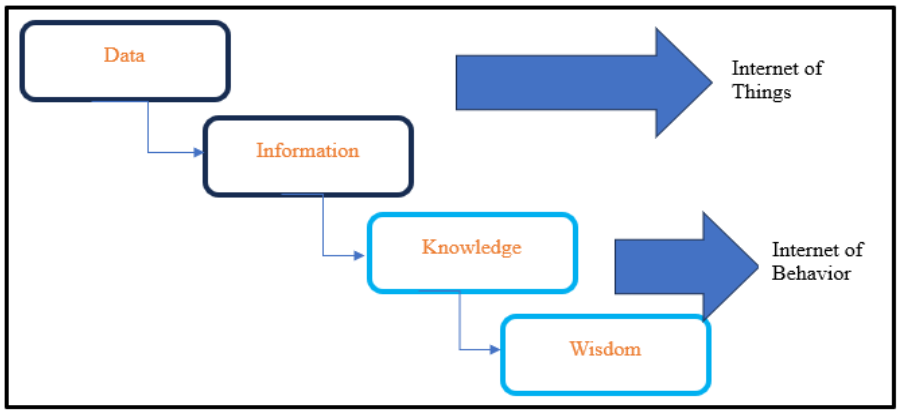

Figure 1. Interaction Between IoT and IoB

What is IoB?

IoB is a use case for IoT that concentrates on encouraging consumers to enhance particular outcomes (such as the profitability, sustainability, and societal well-being of IoT providers, among other things) (Kotha & Gupta, 2018). As shown in Figure 2, IoB can be seen as the meeting point of three pillars:

- **IoT:** Provides information on clients, like their location, daily schedule, health status, etc.
- **Consumer psychology:** Looks to comprehend the driving forces behind a person's behavior.
- **Big Data analytics:** Big data is a blessing to the world of data-driven insights (Sharma & Dash, 2020). To uncover trends in behavior and provide recommendations, algorithms can integrate IoT data, logs, and psychological research.

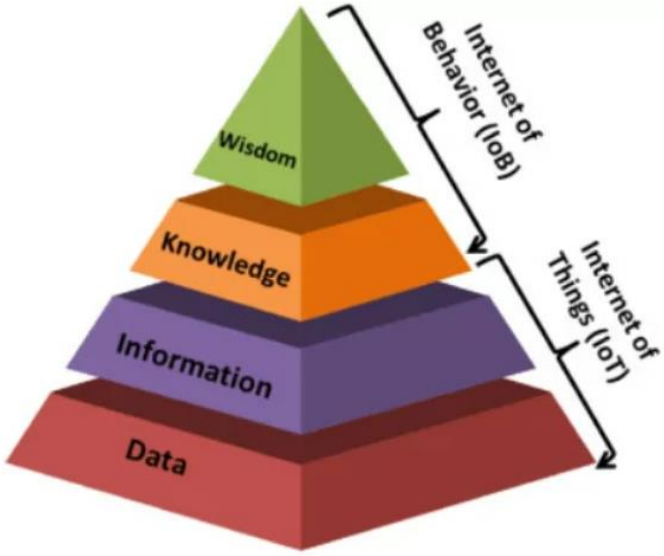

Figure 2. Internet of Things (IoT) and Internet of Behaviour (IoB) pyramid

Above three components are used in IoB, the logical next step after IoT, to increase customer satisfaction and revenues over the long run. Big data has been used by businesses to comprehend the demands and wishes of their clients (Javaid et al., 2021). However, by combining big data with sophisticated AI/ML-driven data interpretation models and psychology, it is possible to comprehend the driving forces behind customer decisions and boost revenues by influencing consumer behavior.

One of the top 10 trends identified in Gartner's strategic technology research for 2021 is the Internet of Things (IoB), which has the potential to generate a lot of value (Panetta, 2020). Marketing departments can leverage the big data generated by IoT devices to boost sales, which is covered under the IoB topic. Additionally, as IoB offers additional insights into client preferences, it may help business owners and executives make investments that are more data-driven. For instance, by personalizing the customer experience, a vehicle insurance business can base its pricing on a customer's driving behavior.

Know your customer

In the digital age, knowing your customers better will help your business flourish. An algorithm that analyzes people's Facebook activity has been determined by researchers at Stanford and Cambridge Universities to know them better than their friends and families do. Depending on the permissions granted, even a mass-produced device like a smartphone today has the ability to monitor our internet activities and whereabouts. Businesses may therefore be able to understand us better than anyone else. With this information, businesses can successfully adapt every part of their marketing (such as pricing, product, channel, message, and timing) and keep a closer eye on trend changes. The main three advantages of IoB are:

- A business can more precisely predict the demand for its products by examining the data of its customers.
- Marketing campaign optimization is possible for firms using the IoB.
- Customers can gain from IoB if it is used to assist them in improving their well-being.

Research Question: How does the Internet of Behaviors (IoB) Change the World of Know Your Customer (KYC)?

Objectives

- To analyze the applications of IoB across various industries today.
- To describe the challenges in the world of KYC.
- To describe how IoB is changing the world of KYC.
- To showcase how IoT influences the impact and effectiveness of IoB.

Literature Review

Arner et al. (2019) describe that identity is a crucial element in financial institutions and organizations. These organizations constantly experience fraud and crime attributed to individuals trying to make money illegally. Arner et al. (2019) describe that KYC was introduced to help financial organizations deal with fraud and crime. The article describes that financial organizations are obligated to identify their customers to ensure that market integrity is achieved (Kapsoulis et

al., 2020). Know Your Customer has, however, introduced several challenges and issues for financial service providers.

Arner et al. (2019) describe that KYC is greatly impacted by cybersecurity issues. Cyber threats have challenged the efficiency and stability of the KYC systems adopted by various financial institutions. Moyano & Ross (2017) also identify that the KYC process has become a significant challenge for many organizations today. This has been attributed to the rise in costs. Moyano & Ross (2017, p.411) state that "The know-your-customer (KYC) due diligence process is outdated and generates costs of up to USD 500 million per year per bank." Banks have, therefore, suffered greatly due to the current processes and systems used in the world of KYC.

KYC has become a significant concern because of the increasing rise in e-commerce businesses being established daily (Kapsoulis et al., 2020). The rise in e-commerce websites allows criminals to easily engage in money laundering and other fraudulent activities (Lemon & Verhoef, 2016). This also shows the continued need to implement effective solutions that address the gaps identified today (Kapsoulis et al., 2020). Global KYC regulations continue to force companies to identify effective ways to improve their systems without risking the market's integrity.

Internet of Behavior is an effective action and solution that has grown due to the continued rise of IoT. Many manufacturers are developing electronic devices that can be accessed and controlled through the Internet (Khodadadi et al., 2016). The development of these devices has been a significant factor in promoting the amount of data and information collected daily.

Khodadadi et al. (2016) describe that the amount of data collected through IoT devices is increasing daily. This has been identified to be a result of the economic and technical contributions associated with these technologies. The data is collected through sensors embedded in these technologies. Khodadadi et al. (2016) describe that the data can be stored and analyzed to be used in other situations and presented in situations that could benefit the applications that the data has the potential to offer.

Internet of Behavior is still a new technology that most scholars are identifying will revolutionize the way most operations are conducted today. The technology has been identified to play a significant role in influencing how data from IoT could be converted into knowledge and wisdom (Kamilaris & Pitsillides, 2016). The data and wisdom could be used to make more effective decisions in different sectors. One of the key benefits and contributions of IoB is its influence in influencing consumer behavior. The ability to provide an understanding of consumers makes the technology very relevant in the world of KYC (Kamilaris & Pitsillides, 2016).

Internet of behavior is considered to rely on the Internet of Things to effectively obtain data that can be used to predict and identify consumers. IoB has today been used for several applications other than in the world of KYC. One of the key applications of IoB has been in digital marketing (Kamilaris & Pitsillides, 2016). Social media advertising relies on a proper understanding of the consumer. Customer interactions with different products today allow marketers to target individuals more likely to buy the service or product. IoB also has the potential to be implemented in government policymaking. A survey of citizens can guide the government on what factors directly influence the citizens.

Methodology

Theoretical Framework

The impacts of IoB worldwide on KYC can be identified and described through the Technology Acceptance Model (TAM). The TAM is a relevant and effective model that describes people's willingness to accept a new technology (Inayatulloh, 2020). The technology describes that people's readiness to use a specific product will be influenced by the ease of use and usefulness of the technology. IoB relies on IoT to obtain data and information. The IoT devices are, therefore, critical external factors that influence the overall data and knowledge obtained (Pinto et al., 2019). The adoption of IoT devices will then be integrated to provide data and information, which can be conducted to knowledge and influence the world of KYC. Figure 3 below shows the model and how different factors will influence the world of KYC. The image identifies IoT, the Internet of Everything, and People as the external variables. The external variables influence the perceived usefulness of IoB and ease of use for IoB technology.

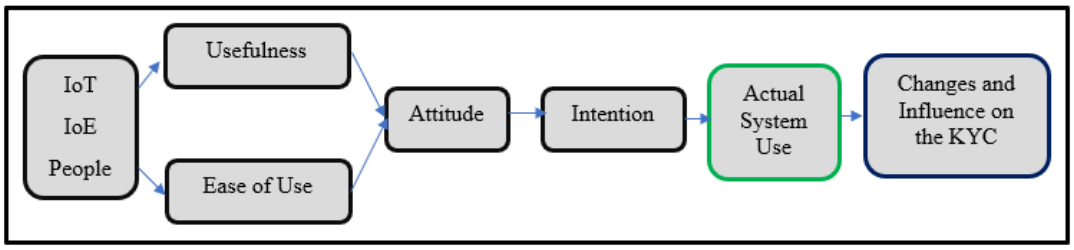

Figure 3. TAM Model for the Study

Data Collection

The data will be obtained from secondary research materials. Secondary data from journals and published articles will be reviewed to showcase some of the common themes. These themes will then be analyzed to identify the exact influence and impact of IoB on KYC. KYC and IoB will be identified as the key variables needed in analyzing the information available. The articles selected will be screened to ensure that they include relevant information and that they include information published within the last seven years.

Results and Discussion

Lemon & Verhoef (2016) describe the Know Your Customer concept as crucial for businesses across all industries. The focus on KYC is a needed process for every business. Lemon & Verhoef (2016) identifies that technology has become a relevant tool needed in KYC. The article identifies that some of the ways technology has promoted KYC include the development of customer journeys through well-developed databases. The article identified social media as an effective tool to showcase the customer's journey and overall experience (Yadav & Chandak, 2019). The companies are then advised to adopt this information when making future decisions effectively, therefore meeting their customer's needs.

Kapsoulis et al. (2020) identified that KYC standardization is crucial in meeting the needs of businesses. The article described that one of the challenges businesses have experienced today is the lack of standardization of KYC. The consumers were, therefore, being impacted by the KYC technologies introduced by different businesses. Kapsoulis et al. (2020) propose using Blockchain as an effective solution in addressing the concerns over KYC. The article identified that KYC could better be protected by engaging in a decentralized system that ensures that all parties have been protected and that business operations have been maintained.

KYC is crucial for every business because it helps the business meet the needs of every consumer (Baros & Papalou, 2018). Figure 4 below summarizes some of the benefits of KYC within a business. The benefits identified would, therefore, be promoted if IoB was integrated and applied, ensuring that businesses have reached their targets more effectively.

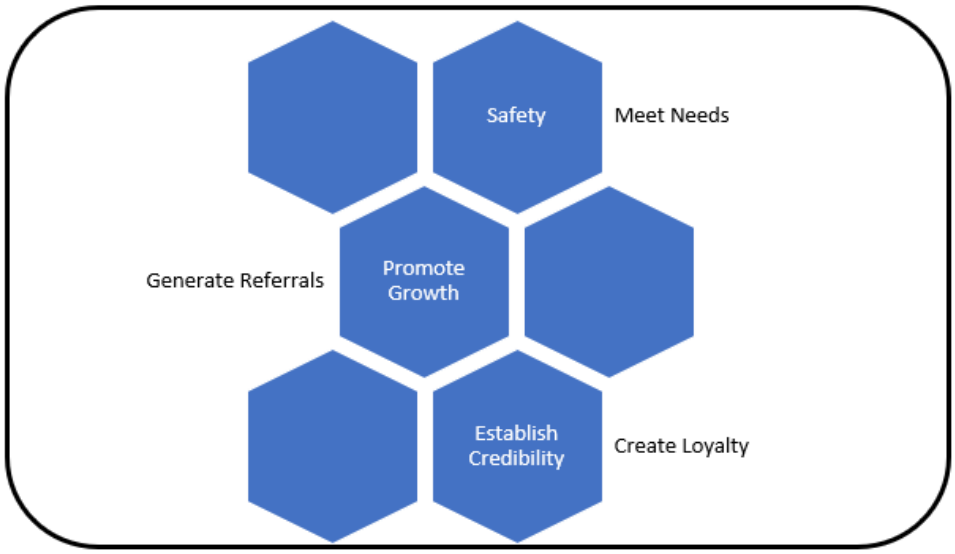

Figure 4. Benefits of KYC through IoB

IoB is an effective tool for promoting growth within businesses that benefit from KYC (Miraz et al., 2015). Financial institutions, for example, can obtain a better idea of their consumers by reviewing the data collected from their Internet of Everything (IoE) devices (Miraz et al., 2015). The growth of IoB is expected to improve how well businesses understand humans significantly. The knowledge obtained from IoT devices and the sensors embedded will be reviewed to showcase whether the customers would have engaged in any fraudulent activities.

IoB is expected to promote success in the insurance sector effectively. Insurance companies often charge customers depending on how well they drive. Car insurance companies are expected to use IoT devices in the vehicles to help make decisions (Suman, 2017). IoB from car driving is identified by reviewing how well drivers follow the rules on the road. Braking IoT sensors also showcase whether the acceleration and brake patterns follow the required standards for the insurance company (Yadav & Chandak, 2019). Customers who engage in such patterns can have their insurance costs reduced. This signifies a major way through which IoT will be used in changing KYC.

The healthcare sector operates by understanding and knowing its consumers. KYC in the healthcare sector is crucial because it ensures physicians have recommended the best treatments for their patients. One of the potential uses of IoT devices is tracking someone's blood pressure and temperature. Wearables have become critical in recording vitals, which doctors could use in treating individuals (Somasundaram & Thirugnanam, 2017). Integrating IoB in the healthcare sector is expected to help improve the information that doctors obtain from their patients. This information can then be used by doctors to treat chronic illnesses.

Digital marketing, which influences all businesses, is another critical advantage of IoB. IoT devices have already been identified as crucial elements and technologies that can be adopted

in predicting a consumer's behavior (Pinto et al., 2019). IoB in the marketing sector is expected to provide an even more detailed idea of consumers and their practices. Marketing based on this information will help businesses to promote their success in marketing effectively. Marketing will become more personalized and ensure businesses achieve more growth (refer to Table. 1) and development attributed to their marketing success (Pinto et al., 2019).

Table 1. Implications of IoB in KYC

Sl. No	Applications	Description
1	Analyze Human Behaviors	IoB ties data to human action, allowing for a deeper comprehension of behavioral patterns and preferences.
2	Change of Culture	The IoB solution connects data to our decision-making, necessitating modifications to the established cultural and legal standards. Additionally, it may look through contacts' social media profiles to better forecast how they would behave when using a product.
3	Customer Habits	Cybercriminals have access to private data that reveals consumer behavior. They seize and trade access for goods and transmission lines. This will enable them to create more complex schemes, raising the bar for their phishing.
4	Tracking and Monitoring	They were primarily utilized to monitor and record the trends that were indicative of our purchase behavior. Industries can affect consumer behavior by creating smartphone apps that track dietary intake, sleep patterns, heart rates, and blood sugar levels.
5	Linking customer behaviors	It incorporates current technology that is expressly geared toward the user, such as location tracking and vast data, and links data to related behavioral activities like cash transactions or smartphone use. Organizations can easily affect human behavior using this method
6	Review Past and future patterns	This makes it possible for enterprises to evaluate the past and project the future. The information gathered by this technology will serve as the foundation for business development, marketing, and sales initiatives.

Challenges in Implementing IoB

Nevertheless, we have concentrated on the advantages of the IoB. However, the following things should be taken into account when implementing an IoB model. The challenges are outlined below:

i. Privacy concerns:

Big data analysis and storage for the purpose of boosting profitability can provide challenges due to the significant volume of personal data involved. Although the use of private data is becoming more and more controlled, there are technologies that enable data processing without disclosing private data. Please read our data privacy articles for more information.

ii. Compliance and regulations:

Compliances and regulations are not kept up with technological advancement. There are still legal issues that must be resolved. For instance, data security procedures are not widely standardized.

iii. Cyberattack threats:

Users are more susceptible to cyberattacks the more we rely on digital technologies for daily chores. People still need to think about these dangers despite the proliferation of cybersecurity technologies and even insurance.

iv. Data sharing issues:

Some people might not wish to reveal their private information. Let's examine the situation of auto insurance. 47% of drivers don't want their driving information to be shared, according to Deloitte. Driving data includes details like average speed, amount of full brakes used per kilometer, driving routes, etc (Javaid et al., 2021). IoB refers to the addition of new data, like internet browsing history. If you search for "how to drive fast," for instance, the premium price for you can be higher.

v. Manipulation of data for profit and control:

Let's go back to the person who wishes to stick to their diet as an example. What if this person has a completely healthy body but is persuaded to start a diet by a healthcare professional? For instance, it would be possible to persuade people to spend more on healthcare if they have excessive health concerns. IoB can be used by governments or political parties to influence citizens, such as during elections.

Recommendation and Conclusion

IoB has quickly evolved into a universal setting that regulates human behavior. To connect people and computers for behavior analysis, a milestone is required. IoB analyzes behavioral data before determining its potential. In order to develop methods for producing and selling things to consumers, businesses have examined, tested, and used a variety of methodologies. Ethical use of IoB tools and technologies are going to change the world of how business handles and interacts with customers. The world of business operations and consumer interactions will alter as a result of the ethical use of IoB tools and technologies.

IoB has many potential applications in the world of KYC. KYC is shown to be critical across different industries. Many companies operate by understanding their customers. The

financial industry benefits from KYC because it ensures that credibility for the customer has been ascertained. IoT devices have already proven to be reliable and effective tools in promoting most operations by businesses. IoB is, therefore, a relevant aspect because it ensures that businesses are more informed about the customer and can effectively meet their needs. The different applications of KYC can be promoted through integrating IoB. IoB will, therefore, significantly transform the world of KYC.

The main limitation identified in the study is that a limited number of studies were reviewed. The studies were also limited to those published in English. Future research should focus on obtaining more studies. More studies will allow for more information to be obtained, therefore identifying the exact impact that IoB has on the world of KYC. Future researchers should also focus on how businesses can benefit from integrating KYC solutions and promote business growth and development.

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