The impact of artificial intelligence implications on customer satisfaction: applied on the online banking sector in Egypt

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Abstract:

This research paper focuses on how artificial intelligence (AI) has been widely used in the field of the financial technology through mobile banking (M-banking). Nevertheless, in the literature, shows how AI features and M-banking application characteristics affect customer satisfaction. According to the social support theory (SST), there were two AI features have studied perceived anthropomorphism (PA) and perceived intelligence (PI) to develop a research model to investigate how PA and PI affect customer satisfaction towards M-banking. In addition, to address the research gap found, this paper studied variables under the M-banking characteristics which are; ease of use, service speed, security and information content. These variables studied in order to investigate which of the AI features or M-banking

characteristics will have a stronger effect on customer satisfaction. This study implemented a non-probability convenience sampling technique to gather a total of 447 valid responses to validate the proposed conceptual model. The results showed that PA has an insignificant impact on customer satisfaction. While PI, ease of use, service speed, security and information content have a significant positive impact on customer satisfaction. Surprisingly, M-banking applications characteristics has a stronger impact than AI features on customer satisfaction. By this study, it exposed how AI and M-banking applications affects customer satisfaction have been confirmed.

Keywords: Artificial intelligence (AI), Perceived anthropomorphism (PA), Perceived intelligence (PI), Ease of use, Service speed, Security, Information content, Mobile banking, Customer satisfaction

1. Introduction

Today, with the technological advancements and increasing competition, businesses have ongoing challenges in attracting and retaining customers (Ali et al., 2023). Today's customers want to spend as little time as possible; as a result, they want to be able to do so whenever they want and from any location, regardless of the time, place, or channel (Nguyen et al., 2022). Artificial intelligence (AI) are a tool for adapting to digitization and enhancing consumer experience (Nawi, et al., 2020). supplying organizations with more channels of communication to improve interactions with

consumers. AI are computer programs that can converse with people in real language. They are also illustrations of interactive systems that let people and machines communicate with one another (Wahab, 2023).

During the COVID-19, one of the most dangerous pandemic outbreaks which affecting the world, it has already altered people's personal, social, and professional lives (Ali, et al., 2023). This pandemic caused people's personal lives and changed their mindset towards the online concept including the online transactions. In order to reduce the spread of this virus, banking sector does not stop working on several electronic solutions which have offered alternatives for not keeping physical cash (Alarifi & Husain, 2023). Which requires social distance in order to save people's life (Nabil et al., 2023). Banking sectors and many businesses exploit this pandemic and the growth of AI to develop their way of marketing and way of better serving their customer in order to be more satisfied or delighted and to be returned into loyal customers (Inan, et al., 2023).

According to Satheesh & Nagaraj (2021). AI has changed many businesses operations but in marketing it made the firm much closer to the customer by knowing what exactly does the customer want and how to serve it. AI work by building itself by information so that it can target customer by specific product or service but that targeting can differ by the time as the customer has different need and so that AI learn from customers what they want through the time (Haddad, 2021). AI is also improving the firm's websites by

collecting search data and provides chatbots which will provide assistance without talking to someone but it is just by chatting with a robot but this robot is not just for instant help but it is for future help as it collects the chatting data from the style of talking or what was asked by the customer and provide future support that has better experience (Chen et al., 2020).

According to Alarifi & Husain, (2023) businesses have benefited from these technology, especially mobile phone apps integrated with AI technologies for maintaining customer relationships and loyalty. Mobile banking (M-banking), for instance, has replaced conventional transactional techniques in the banking sector. Early research indicates that mobile banking will quickly transform the ways in which consumers get services by offering constant payment options (Azhari et al., 2023). M-banking app, an incredibly sophisticated and functional mobile application, enables customers to execute financial transactions using their smartphones (Prentice, 2023). As a result, the M-banking app is seen as a cutting-edge technical advancement in the banking industry that can address client needs regardless of time or location while also offering profitable potential to both consumers and companies (Aziz & Andriansyah, 2023). Mobile users are increasingly adopting the mobile payment app to conduct electronic payments or any financial transactions in the wake of the COVID-19 outbreak. In addition, technologies play a crucial role in both

finding a treatment for the virus and finding ways to cope with the COVID-19 situation (Almajali, et al., 2023).

The research aim is to determine how customers are satisfied with mobile banking after the COVID-19 pandemic. Regarding this, to measure the level of their satisfaction in the M-banking sector in Egypt. Also to determine the aspects of AI features and M-banking characteristics that have an impact on the overall customer satisfaction. This study will add value to the current banking sector, by allowing researchers to show how assessing the quality of a mobile banking service may be utilized for evaluating customer satisfaction. Moreover, the major areas that positively impacted the customers' mobile banking experience which are factors of AI features PA and PI, and M-banking characteristics which are ease of use, security, service speed, information content. They are crucial to this investigation and are considered as the primary indicators of the online banking service quality (Ameen, et al, 2021).

2. literature Review

2.1. Artificial intelligence

Alzaidi (2018) define artificial intelligence (AI) as a developed computer system that is produced by human intelligence to carry out tasks and develop itself to carry out human activities like language translation, voice recognition, and decision making. AI in marketing was required to address the

issue of determining what the consumer really wanted. According to Nguyen et al. (2022), AI may behave humanely and can communicate, learn, and give the same level of intellect as humans. According to (Alzaidi, 2018), computer systems with AI are more effective and superior to those with human expertise. A training algorithm may look into important characteristics that the researcher is ignorant of, and a convolutional network can independently detect and recognize complex notions in photographs like "logos" or "eyes," among others (Nawi, et al., 2020). In order to solve problems better than current computer systems, AI research focuses on developing advanced human-like abilities such as thinking, learning, and self-correction. In other words, the economy is about to undergo a profound change as a result of AI, which allows robots to replicate human intellect (Bock et al., 2020).

2.1.1. Perceived anthropomorphism

AI-powered mobile banking characterizes as exhibiting human-like behavior via the use of distinct and customary human attributes (Malhotra & Ramalingam, 2023). The use of a perceived anthropomorphism (PA) in the context of M-banking enables the establishment of interactions that closely resemble those between humans (Moussawi et al., 2022). This fosters the development of strong social bonds between the PA and customers, thereby leading to an enhancement and improvement of the overall service experience for customers engaging with M-

banking. Hence, it is vital to comprehend the significance of AI in the integration of M-banking (Lin & Lee, 2023).

According to Lee et al. (2023), AI-powered mobile banking has the capability to provide valuable recommendations, prompt and effective replies, as well as personalized solutions that align with customer input and individual requirements. The efficacy of M-banking's intelligent capabilities is rooted in its capacity for information retrieval and active adaptive learning (Moussawi et al., 2020). These features empower M-banking to effectively meet customers' demands for immediate feedback and up-to-the-minute information (Shum et al., 2018). Simultaneously, mobile banking enhanced by AI has the capability to retain customers' identities and historical actions, proactively inquire about their requirements, automate form completion, and provide tailored assistance (Lin et al., 2021).

Additionally, it has been observed that AI-driven mobile banking systems include humanistic attributes, such as assigned names and visual representations, which instill a sense of enhanced accuracy and dependability among customers in relation to the information disseminated by these mobile banking platforms (Shum et al., 2018). The application of social experience between humans to the interaction with an anthropomorphic system is a natural tendency seen in individuals (Meng and Dai, 2021). Consequently, the incorporation of PA may enhance the perceived trustworthiness of the information

delivered by the system. According to Liu et al. (2023), the effectiveness of information support in forecasting customers' continuance intention is attributed to its ability to provide consumers direct utilitarian benefits and fulfil their extrinsic objectives. If the information system elicits positive emotions in customers throughout their use of M-banking, it is probable that they will have a higher propensity to sustain their usage of the system (Chan & Gohary, 2023).

2.1.2. Perceived intelligence

According Balakrishnan & Dwivedi (2021) perceived intelligence (PI) is a key element of artificial intelligence. To address complicated issues that are difficult for humans to handle, intelligent systems which began to play a significant role in the field of information systems. M-banking, various chatbots, and many others are recent innovations in intelligent systems that leverage a network of interconnected algorithms and data forecasts to demonstrate more human-like intelligence (Akter et al., 2019). However, as all AI algorithms now include the ability to interpret data cognitively and logically (Hossain et al., 2020), intelligence has developed into a crucial characteristic for any AI-powered systems. From a commercial standpoint, intelligence affects how people perceive an item, particularly when adding human-like features to it. The customer's view of the technology's capability and intelligence is known as perceived intelligence. Most often, perceptions of intelligence are based on

how competent a system is (Mariani & Borghi, 2023). Knowledge, common sense, and responsibility have been studied in the past as the key elements of intelligence. Digital and voice assistants were described by Moussawi et al. (2020) as Personal Intelligent Agents (PIA), which work cleverly to respond to and help customers based on the gathered conversation data. Based on their functionality and intellectual architecture, which responds to human enquiries and PIAs which are recognized as intelligent systems. Although digital assistants first served as a helpful tool to help customers with their normal tasks, they subsequently started playing an important role by enhancing their touchpoint in all facets of the customer's life (Gao et al., 2023). The learning rate that the digital assistants acquire from the customer's interaction and translate into an intelligent quotient, leading to a higher result and performance, may be credited to one of the biggest triumphs and advancements in the technology. In addition to serving as a useful tool, digital assistants have evolved into participants in the customer decision-making process, according to Seeber et al. (2020). The same was backed by Elwalda et al. (2022), who emphasized how these tools have begun to play a significant part in human existence and that their intelligence is growing as a result of learning. Yang et al. (2020) highlighted in their study how machine intelligence may improve retail operations and provide individualized customer care. While several academic studies have shown that chatbots, PIAs, and

digital assistants are becoming more intelligent, their interactive systems make it easier for humans to ask questions.

2.2. Mobile Banking

M-banking, as a growing technological platform within the field of financial technology, has the potential to provide customers enhanced convenience and reduce the challenges posed by physical barriers. Individuals have the ability to efficiently carry out financial activities, including transactions, investments, and other nonfinancial processes, with convenience and accessibility from any location. M-banking has the potential to decrease operational expenses and enhance competitiveness for financial institutions (Lee et al., 2023). M-banking is the practice of using mobile devices to access banking services and conduct financial and non-financial transactions electronically without a bank personnel present (Manser Payne, et al., 2018). M-banking is a cutting-edge sales channel for banks; it enhances operational effectiveness, boosts productivity, lowers payroll costs, and improves communication with clients (Manser Payne, et al., 2021). Customers may take use of banking services anytime, anyplace using M-banking. People in places with poor infrastructure may now access financial services via M-banking (Suhartanto, et al., 2022). According to Inan et al., (2023) although M-banking has many advantages, it also presents a number of obstacles for its service providers, notably in terms of its continued use by current consumers. These difficulties are a

result of the competitive advantage, which is more significant than the efforts made to create the M-banking ecosystem for both providers and consumers. In other words, in order to recoup these expenditures and be successful, consumers must be kept and their continued use must be supported. Retaining current customers is the only way for banks to succeed and recoup their significant investment in M-banking (Mandari et al., 2020).

2.2.1. Ease of use

According to Kumar et al., (2020) The perception held by individuals is that the use of technology will result in enhanced ease of use. The concept of ease of use has been used in several research investigations. The findings of these empirical investigations indicate that ease of use has a positive impact on individuals' attitude to use mobile banking services. The level of an individual's belief on the ease of use a certain system. Furthermore, the use of technology by individuals requires cognitive capacity and a significant investment of time (Alonso-Dos- Santos et al., 2020). The perceived ease of use of mobile banking is believed to enhance its utility, since individuals perceive that using this service requires no effort (Thusia & Maduku, 2020). The impact of perceived ease of use on perceived utility of mobile banking services was shown by researchers. The behavioral intention to use mobile banking and subsequent actual usage of mobile banking are influenced by

both the perceived utility and perceived ease of use of this service (Gumussoy et al., 2018).

The perceived ease of use of a technology is considered a significant element that impacts consumers' adoption decisions (Alqasa, 2023). The concept of ease of use pertains to the degree to which a person believes that the use of a certain system or technology will improve their ability to execute their work effectively (Owusu et al., 2020). Although, researchers' perspective of TAM framework as the subjective likelihood that a potential customer would experience improved job performance within an organizational setting upon adopting a particular application system (Malaquias & silva, 2020). Furthermore, within the context of mobile banking, the concept of ease of use refers to the perceived advantages that consumers get from using mobile banking services for conducting financial transactions (Ahmad et al., 2023). The theory claims that the level of perceived usefulness of a certain entity has a direct impact on an individual's attitude towards its use, thereby influencing their desire to utilize it (Gumussoy et al., 2018). The existing body of research offers empirical evidence that ease of use significantly influences individuals' choices to use mobile banking. It is also identified as the primary determinant of individuals' behavioral intention to embrace mobile banking (Garg et al., 2023; Karjaluoto et al., 2021). Several previous research has shown that the perceived utility of a certain online

technology has a direct and considerable impact on individuals' behavioral intention to use it (Malaquias & Silva, 2020).

According to Alt et al., (2021) customer's positive attitude to M-banking as they are easier to use as it can manage financial transactions including monitoring their accounts, reporting lost cards, making payments, renewing their policies, and processing refunds (Nguyen et al., 2022). Additionally, the acceptance and spread of chatbots in the context of insurance were explored in recent studies that focused on chatbot technology applied in the financial industry (Ameen, et al, 2021). These studies came to the conclusion that the majority of the participants were familiar with the technology and would like to use it at the beginning of the advice process.

2.2.2. Service speed

According to Smith et al. (2020), it is crucial to investigate the correlation between mobile banking service speed and customer satisfaction, particularly in how Egypt's financial services industry is developing. The importance of this problem is expanding, according to recent study. Speed plays a crucial part in determining how satisfied customers are with mobile banking apps (Al Mamun et al., 2023). Previous studies discovered that consumers in developing economies, such as Egypt, put an importance on rapid and efficient services, and that delays in transactions, loading times, or application responses may dramatically lower customers' satisfaction levels as a whole.

Mobile banking companies must make investments to speed up their apps in order to keep up with the changing needs of their Egyptian customers (Neves et al., 2023).

Additionally, a research by Ali and Rahman (2019) explores the specifics of mobile banking in developing nations and offers insights that are particularly relevant to the market conditions. The study focuses on how service speed and customer satisfaction interact, showing how customers' expectations for quick, simple transactions increase, as mobile banking apps become more connected into financial transactions (Liu et al., 2023). As customers want for simplicity and efficiency in their financial transactions, the research in this context supports the idea that boosting the speed of mobile banking services is directly connected to increased customer satisfaction (Ribeiro et al., 2023). These observations highlight the need of emphasizing service speed improvements as a significant factor in customer satisfaction in the context of mobile banking in Egypt. This study has applications for mobile banking companies looking to differentiate themselves from the competition and better meet the demands of Egyptian users (Twum et al., 2023).

2.2.3. Security

According to Alkhaibari et al., (2023) security and safety are two key concerns for any organization. Service security is seen as being essential to any financial institution's performance. M-

banking is protected using reliable and quick encryption techniques (Gumelar et al., 2020). Personal information and transactional data are protected digitally in every manner feasible. The phrase "service security" refers to how the providers project a feeling of trustworthiness (Johnson & Patel, 2019). This security aspect is included in all of the parts and tools used by renowned national banks. It involves a system that ensures the consumer is free from danger and uncertainty and feels comfortable in their transactions (Smith et al., 2020). Customers are also given a sense of anonymity by being informed that both their access to the system and any transactions done inside are private. Because they know the system is secure from hackers and outside incursion, customers feel more at comfortable using it (Smith et al., 2020; Johnson & Patel, 2019).

Security in the context of mobile banking refers to consumers' perceptions of the service as secure and free from privacy concerns. Because M-Banking is a newer information technology, people have little familiarity with it. Mobile device security is a major problem since personal information is maintained there (Zhou et al., 2021). According to a recent research by Al Mamun et al., (2023) security is a key factor in people's willingness to embrace mobile commerce, the importance of security and privacy was greater than perceived usability and simplicity of use (Yau & Tang, 2018).

2.2.4. Information content

According to Alkhaibari et al., (2023) this variable refers to the kind of material that the bank must provide to its customers. The banks continue to send messages on different social media applications and update their websites with the most recent information and statements to keep their customers informed (Chang and Chen, 2019). Customers should get content updates on a frequent basis (Kumar et al., 2020), It refers to the information that banks provide to clients through websites while providing online banking services (Pitardi, 2023). High value-added content is crucial, and the majority of banks are fully aware of this (Alhadreti, 2023).

Transactional efficiency is the ability of a consumer to visit a website, find the needed goods and information related to it, and check out fast (Almazroi, 2023). The banks and financial sectors are working to upgrade the digital infrastructure. In order to make the system efficient and effective for investors, the bank itself, and the customers, it has set up infrastructure and investing norms (Ali & Salameh, 2023). On the basis of the following criteria, the effectiveness of online banking may also be evaluated in terms of transactional efficiency: up-to-date information, response and download times, thorough product information, tutorials and demonstrations, and assistance functionality (Ting & Abdullah, 2020). Information content has a substantial impact on customer

satisfaction, and there is a positive relationship between these two factors (Alkhaibari et al., 2023).

2.3. Customer satisfaction

Customer satisfaction is an individual's immediate emotional response to the provision of particular services (Kar, 2020). The significant difference between perceived and actual service performance determines the degree of satisfaction. Customers will be disappointed if service performance falls short of expectations (Chalik & Faturohman, 2022). Customers will feel satisfied if performance meets expectations. Customer satisfaction, on the other hand, is the degree of one's emotions following a comparison of the perceived performance with expectations. Product, purchasing, and service satisfaction are all indicators that can be used to measure this variable (Tarigan, et al., 2022). Customer satisfaction is described as an overall assessment based on the entire purchasing experience of the performance of the actual service or product compared to the expectation prior to the purchase over time (Lim et al., 2023). Additionally, customers' purchasing process is also influenced by the satisfaction and trust of the customer, both of which are essential components. Regarding AI-powered mobile banking is capable of expressing concerns to customers with affective understanding and provide some customized assistance when they encounter issues using banking services, which may in turn raise customers' emotional assessments of mobile banking and increase customer satisfaction (Lengkong et al., 2023). Customers

are satisfied as a result of informational and emotional support, which also influences their intention to continue using the service (Lin & Lee, 2023). Furthermore, extensive study was conducted to determine the positive association between customer satisfaction and the quality of mobile banking services. The model of service characteristics explores the relationship between customer satisfaction and mobile banking service (Lim, et al., 2023).

2.4. The conceptual model and research hypotheses

A conceptual model was designed based on previous studies on AI features and mobile banking characteristics to show the correlation between perceived anthropomorphism, perceived intelligence, ease of use, service speed, security, information content and customer satisfaction. The below sections discuss the proposed research hypotheses.

2.4.1. Perceived anthropomorphism and customer satisfaction

According to Khenfer et al., (2020) the degree to which customers believe non-human things, such as brands, to exhibit human-like traits, motives, and behaviors is known as perceived anthropomorphism. To give customers the impression that the brand is a purposeful agent that is capable of engaging with them, brand managers often provide their products human-like characteristics in the form of visual, language and or rhetorical cues (Seo, 2022). Due to their high degree of sociality, customers

develop connections that imitate those they would have with real people. Consumer preferences and satisfaction may be affected by how much anthropomorphism is considered to be present in a product or service. According to Yuan & Dennis (2019) Anthropomorphism has an impact on attitudes and behaviors, but little study has looked at how it influences desire to pay. Computer customers are able to recognize human characteristics in computer behavior, and they like devices that share their personality features (Klein & Martinez, 2022). When people are informed they are collaborating with a computer on a task, they rate the computer substantially higher than when they are told they are using it alone. Researchers have studied how people behave towards virtual, non-human agents (Blut et al., 2021).

H1: There is a positive significant impact of perceived anthropomorphism on customer satisfaction

2.4.2. Perceived intelligence and customer satisfaction

According to Xu et al., (2020) stated that customers often associate more intelligent AI systems with outcomes that are reliable, accurate, and efficient. A greater level of customer satisfaction may result from an AI system that properly understands and responds to what the customer wants. Customer satisfaction may be improved by AI systems that can personalize and customize interactions based on unique consumer preferences and circumstances. Customers' satisfaction may increase if they believe the AI knows them better and can provide

personalized suggestions or solutions. Advanced natural language processing skills and the ability to communicate like a person make AI systems increasingly regarded as intelligent. Customer satisfaction may increase when they can have conversational interactions with AI systems and obtain concise, contextually appropriate replies. According to Prentice & Nguyen (2020) mentioned that customer satisfaction may be increased by AI systems that show a knowledge of the larger context of their requests or duties. Customers may feel more intelligent and satisfied if they believe that the AI system understands the subtleties of their demands or circumstances. Customer satisfaction may be impacted by the AI systems' clarity and comprehensibility. Customers may feel more faith in the intelligence and dependability of AI systems when they are given explicit justifications for their choices or actions, which might increase their satisfaction (Wu et al., 2023).

H2: There is a positive significant impact of perceived intelligence on customer satisfaction

2.4.3. Ease of use and customer satisfaction

According to Kumar et al, (2020) The goal of mobile banking is to provide customers convenient access to their financial services whenever and wherever they are. Customers may swiftly and simply carry out different banking functions, such as checking account balances, transferring money, or paying bills, when mobile banking apps are created with an emphasis on

simplicity of use. The ease of access and convenience are factors in client happiness. App interface, design and layout, well-labeled buttons, and organized structures enhance ease of use in mobile banking applications, making it simple for customers to navigate and find the desired functionalities. Customers' satisfaction with the mobile banking app is positively impacted when they can easily understand and interact with it. According to Alonso- Dos- Santos et al., (2020) stated that mobile banking's ease of use involves simplifying transactions and reducing the number of steps needed to complete routine operations. For instance, a streamlined procedure for paying or transferring money lowers consumer effort and increases satisfaction (Kumar & Balaramachandran, 2018). A favorable customer experience is enhanced through mobile banking applications that include pre-filled forms, instant access to transaction history, and simple account management tools. Customers that use mobile banking are empowered to do numerous activities on their own. Customers become less reliant on conventional banking channels when they can readily access self-service capabilities like changing personal information, altering card settings, or contacting help. The comfort and empowerment of this help customers feel satisfied (Kumar et al, 2020).

H3: There is a positive significant impact of ease of use on customer satisfaction

2.4.4. Service speed and customer satisfaction

According to Dey et al., (2019) mentioned that customers who use mobile banking appreciate speedy service since it makes it easy for them to execute transactions and get information. Customers can quickly and easily carry out actions like checking balances, moving money, and making payments when mobile banking services are quick and responsive. A greater level of consumer satisfaction results from this effectiveness and ease. Customers may save time and effort by using mobile banking with quick service. Customers like the ability to do their banking duties quickly while on the move, without having to go to a physical branch or stand in lengthy lines. Customer satisfaction is influenced by an organization's capacity to perform transactions quickly and effectively. Aldiabat et al., (2019) explained that customers are more satisfied with mobile banking services that provide real-time information and alerts about account activity, transactions, and balances. When customers use their mobile banking app to obtain timely updates, it indicates responsiveness and raises their level of satisfaction overall. Customers like the immediate nature of information. It is essential that mobile banking transactions be processed quickly. Customers anticipate that transactions like cash transfers and bill payments would be handled properly and quickly. The ability of mobile banking services to conduct transactions promptly and correctly increases

client satisfaction by delivering a seamless and effective experience (Al-Araj et al., 2022).

H4: There is a positive significant impact of service speed on customer satisfaction

2.4.5. Security and customer satisfaction

Gumelar et al., (2020) explained the security is the first priority in mobile banking. Customers are more confident utilizing the mobile banking service when they know that their financial information and transactions are safe. A better level of customer satisfaction results from this confidence and trust. Sensitive financial and personal data are sent and stored while using mobile banking. Customers anticipate that their private information will be secure against fraud, identity theft, and unauthorized access. Customer satisfaction depends on effective security measures, including encryption, safe authentication mechanisms, and secure data storage (Gumelar et al., 2020). Security and customer satisfaction are inseparable in the context of mobile banking, and this connection is crucial (Johnson & Patel, 2019). Financial institutions must give priority to the security of these digital platforms since recent developments in mobile technology have fundamentally changed how customers access and manage their funds. In addition to fostering trust, a secure mobile banking experience guarantees the privacy of critical financial information (Smith et al., 2020). Customers are more inclined to interact with confidence when they believe that their mobile banking apps are

secure and shielded from online dangers. As a result, people are more satisfied with the services they get since they find it convenient and reassuring to know that their financial transactions and personal information are secure (Cater & Lee, 2021). In recent research on mobile banking security, the need of strong authentication systems, encryption techniques, and real-time monitoring has been highlighted as a way to improve consumer satisfaction by minimizing the potential risk of the lack security (Smith et al., 2020; Johnson & Patel, 2019).

H4: There is a positive significant impact of security on customer satisfaction

2.4.6. Information content and customer satisfaction

The relationship between informational content and customer satisfaction in the context of mobile banking is complex and diverse. For customers to make wise financial choices, high-quality information content is required, such as transaction history, account balances, and real-time notifications. Recent study results on mobile banking, including studies by Chang and Chen (2019) and Kumar et al. (2020), highlights the relationship between customer satisfaction and the content of the information given. Customers tend to feel more in control of their money and more satisfied when they have access to full, current, and understandable financial information via their mobile banking applications. Additionally, Rahmadiana et al., (2021) emphasis on the significance of reliable information cannot be emphasized.

Misunderstandings, dissatisfaction, and ultimately lower customer satisfaction may result from inaccurate information. Consequently, in order to satisfy customers and match their expectations, mobile banking providers must place a high value on the accuracy and quality of information content. In addition, customer satisfaction in mobile banking is highly impacted by the relevancy and timeliness of the information content. Recent studies, such those by Johnson and Gupta (2021) and Lee et al. (2019), highlight how crucial it is to provide customers personalized financial information and real-time updates. Regarding the digital environment, customers desire real-time access to their financial data and notifications about their account activities. Mobile banking is made more secure and satisfying when information content keeps clients informed about transactions, account changes, and possible security issues. Another area of research that has been demonstrated to favorably affect customer satisfaction is the customization of information, customized to unique customer preferences and financial objectives (Ting & Abdullah, 2020). The importance of information content in influencing customer views is emphasized through tailored suggestions and financial insights, which help create a more enjoyable and rewarding mobile banking experience.

H6: There is a positive significant impact of information content on customer satisfaction
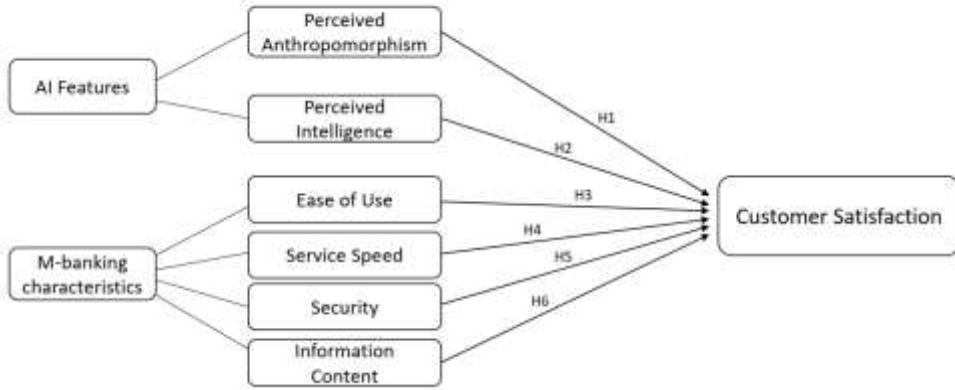
Figure 1: Proposed Conceptual Model

3. Empirical study

3.1. Data collection and sampling

In this study, the researcher used a questionnaire approach to gather primary data from the respondents (mobile banking users). Literally, a questionnaire is a set of multiple-choice questions with associated answers. Respondents are required to choose the response based on their own judgement. Respondents can easily comprehend and reply to a questionnaire. Additionally, it's a technique used by researchers to get first-hand information from respondents for later study. As a result, a well-designed questionnaire helps in achieving the aim of the research while also assisting the researcher in gathering reliable information.

Researcher used Google form to publish the questionnaire, the questionnaire is designed into two languages English and

Arabic to make sure that every respondent understands the questions well with his/her language and both versions are identical. The questionnaire was conducted online, the researcher used online platforms to publish the questionnaire and gathering the data such as social media platforms which is Facebook and Instagram pages and WhatsApp groups also the respondents are asked to send the questionnaire to other customers to respond for the questionnaire.

The target population used in this research is the mobile bank applications' customers who are open to technology. The sample size refers to the number of people who going to response on the questionnaires, for that research the sample size was 447 respondents from both genders and different age groups. Majority age respondents' age ranges between 21 to 30-year-old, followed by the second range age was between 31 to 40-year-old. These ranges also have a different background and variety of education such as Undergraduate, Graduate and Postgraduate.

3.2. Questionnaire design and measures

The researcher used the questionnaire as its a research technique or survey to collect information from specific categories or groups of people by asking them a list of questions on a certain issue or topic to achieve the research goal. The responses were both qualitative and quantitative. The questionnaire was developed in a Likert scale. Researchers

has developed a questionnaire about the AI implications and its impact on customer satisfaction that has four sections. Section (A) includes statements related to the AI features of the mobile banking (M-banking) websites which are perceived anthropomorphism and perceived intelligence. Section (B) includes statements related to the M-banking applications which includes ease of use, service speed, security and information content. Section (C) is for the level of customer satisfaction towards M-banking. As for section (D) it includes the demographic questions to know the general information about the respondents such as the gender, age, education, occupation and their preferable bank as well as the usage rate of the mobile applications. The questionnaire statements are displayed in the table below in Table 1.

Table 1. Questionnaire statements

Perceived Anthropomorphism

M-banking chatbot is realistic
Using M-banking to complete a task feels similar to interacting with a real person.
I feel that M-banking chabot is friendly
M-banking chatbot is very responsive & accurate to myqueries/requests.
M-banking provides instant responses after typing texts

Perceived Intelligence

M-banking chatbot can understand my commands
M-banking chatbot can communicate with me in a way that I understand.
M-banking chatbot is able to set tasks by itself in expectation of future user needs.
M-banking chatbot can adapt its behavior based on prior dealings.

Ease of use

M-banking app is easily accessible whenever needed.

M-banking app has an easy inquiry procedure.

M-banking app has easy transaction processing.

M-banking app has a user friendly interface that is easy to navigate.

The layout and organization of the M-banking app are simple and easy to access different services.

Service speed

The connection speed of this M-banking app is fast.

The page loading speed of this M-banking app is fast

The transaction processing speed in this M-banking app is fast.

M-banking app quickly loads my account data, transaction history & other relevant data.

M-banking app shortens time in waiting for instant dealings.

Security

I trust the M-banking apps that has good reputation.

I trust the source of information provided to me by the M-banking apps.

I feel safe while using M-banking services for my instant transactions or inquires.

M-banking app security protect the data that is sent by me.

M-banking app security do not permit changes to data that is sent by me.

Information content

M-banking app provides relevant information content.

M-banking app provides accurate & reliable info about my accounts & banking services.

The info content provided by M-banking app is useful & understood.

M-banking app provides clear instructions to assist me in understanding its features & functions.

Customer satisfaction

I feel comfortable while using M-banking, its better than I expected.

I'm satisfied with the features performance of the M-banking.

My overall AI experience with the M-banking is satisfying.

I am satisfied with the information content provided by the M-banking.

I will give positive feedback about using M-banking.

I am likely to recommend using M- banking to my family & friends as a convenience & trusted site for the future.

4. Results

4.1. Descriptive statistics

According to Table 2. The majority of the sample were females (58.8%). The age group was distributed where most of the sample aged 21 - 30 years (88.8%). More than half the sample are graduated with (63.3%) as an educational background. Observing the occupations of the sample, the highest frequently reported job was for the private sector (79.2%), followed by students (11.2%), then public sector (9.6%). The most bank that is used by the respondents is the National Bank of Egypt (NBE) with (39.6%), followed by the CIB bank with (25.5%). As for the mobile banking application usage, the majority respondents go for less than 5 years of been using mobile banking applications with (79.4%).

Table 2. Demographics pf participants			
Variable	Categories	Frequency	Percentage
Gender	Female	263	58.8
	Male	184	41.2
Age	<20	9	2.0
	21 – 30	397	88.8
	31 – 40	35	7.8
	>40	6	1.3
Education	Undergraduate	38	8.5
	Graduate	283	63.3
	Postgraduate	126	28.2
Occupation	Private sector	354	79.2
	Public sector	43	9.6
	Student	50	11.2

Bank you are dealing with	ADIB Egypt	4	.9
	Ahli United Bank (AUB)	42	9.4
	Alex bank	4	.9
	Arab bank	10	2.2
	Attijariwafa bank	4	.9
	Banque Misr	25	3
	CIB	114	25.5
	Credit Agricole	7	1.6
	El-Arabi Bank	4	.9
	Emirates nbd	4	.9
	First Abu Dhabi bank	3	.7
	HSBC	31	6.9
	National Bank of Egypt (NBE)	177	39.6
	Nbd	4	.9
	NBK	3	.7
	QNB	11	2.5
How long?	Less than 5 years	355	79.4
	5 years	37	8.3
	More than 5 years	55	12.3

4.2. Model assessment

SmartPLS analysis was used to test the conceptual construct to show the validity and reliability of the dimensions. Then the SEM was analyzed to present all the relationships between variables and also shows the final statements used in the analysis.

4.2.1. Measurement model

A full collinearity approach is utilized using PLS-SEM to detect common method bias. Kock (2023) stated that VIFs

should be less than five to ensure that common method bias is not an issue. Overall loadings were greater than 0.5. This shows the importance of the statements in building the structural equation modelling. A confirmatory factor analysis is employed to check reliability and validity. Cronbach alpha (CA) is used for checking reliability. Cronbach alpha was greater than 0.6, thus the statements are reliable and internally consistent. The composite reliability (CR) and average variance extracted (AVE) are both greater than 0.7 and greater than 0.5 respectively. This shows the dimensions are valid in Table 3.

Table 3. The results from the measurement model estimation						
Variable	Statements	Loadings	Outer VIF	CA	CR	AVE
Customer Satisfaction	CS1	0.910	4.338	**0.956**	**0.964**	**0.819**
	CS2	0.872	3.345			
	CS3	0.900	4.241			
	CS4	0.903	4.156			
	CS5	0.938	4.086			
	CS6	0.904	3.995			
Ease of Use	EU1	0.872	2.835	**0.922**	**0.942**	**0.763**
	EU2	0.895	3.173			
	EU3	0.873	2.845			
	EU4	0.894	3.378			
	EU5	0.834	2.398			
Information Content	IC1	0.928	4.057	**0.922**	**0.945**	**0.811**
	IC2	0.875	2.706			
	IC3	0.900	3.170			
	IC4	0.897	2.971			

Perceived Anthropomorphism	**PA1**	0.837	2.373	**0.891**	**0.920**	**0.696**
	PA2	0.849	2.326			
	PA3	0.813	2.037			
	PA4	0.832	2.299			
	PA5	0.839	2.610			
Perceived Intelligence	**PI1**	0.846	2.316	**0.896**	**0.928**	**0.762**
	PI2	0.898	3.184			
	PI3	0.894	3.137			
	PI4	0.853	2.333			
Security	**S1**	0.900	4.251	**0.931**	**0.948**	**0.786**
	S2	0.915	4.608			
	S3	0.924	4.976			
	S4	0.778	1.868			
	S5	0.907	4.433			
Service Speed	**SS1**	0.891	3.601	**0.935**	**0.950**	**0.793**
	SS2	0.866	3.019			
	SS3	0.914	3.952			
	SS4	0.901	3.979			
	SS5	0.879	3.397			

Fornell Larcker is discriminant validity measure. For the model to be validated the square root of average variance extracted should be higher than the correlation of the dimension to other dimensions. Observing table (4), the discriminant validity table shows there was validity since the square root of average variance extracted in study was lower than rest of calculations.

4.2.2. Structural model assessment

Observing the Path coefficients table (4), the AI features had a significant positive impact (β=0.185). Taking a further look in the components, the second level analysis shows the insignificant impact (β=-0.034) of the perceived anthropomorphism on customer satisfaction. However, the impact of the perceived intelligence was stronger (β=0.232) on customer satisfaction. The M-banking characteristics were found to have significant positive (β=0.727) impact on customer satisfaction. Having considered the different components of M-banking characteristics, ease of use (β=0.277) had the strongest positive impact on the customer satisfaction. This was followed by the impact of information content (β=0.259) on customer satisfaction. In addition, the service speed (β=0.165) had a positive significant impact on customer satisfaction at 99% confidence level. While, the least as found to be security (β=0.089) which had significant positive impact on customer satisfaction at 95% confidence level. The R² value the model was 0.772. This can be explained by stating that 77.2% of the variation in customer satisfaction is explained by the model based on perceived anthropomorphism, perceived intelligence, ease of use, service speed, security and information content. Considering Q² value=0.627, it is the measure used for predictive accuracy. As long as it is greater than zero, this shows it was good PLS model. Since the SRMR is a small value close to zero

and equal to 0.1, this shows that the model was excellent fit for data. See Figure 2 for the path coefficient that shows the relationships between the study's variables together with the R-squares. In addition, SmartPLS output of the study's conceptual framework are shown in Appendix 1.

Table 4. Coefficient estimates of SEM			
Hypotheses	Original Sample	Standard Deviation	P Values
AI Features -> Customer Satisfaction	0.185	0.049	0.000
Perceived Anthropomorphism -> Customer Satisfaction	-0.034	0.049	0.489
Perceived Intelligence -> Customer Satisfaction	0.232	0.058	0.000
M-Banking Characteristics -> Customer Satisfaction	0.727	0.049	0.000
Ease of Use -> Customer Satisfaction	0.277	0.063	0.000
Information Content -> Customer Satisfaction	0.259	0.053	0.000
Security -> Customer Satisfaction	0.089	0.048	0.064
Service Speed -> Customer Satisfaction	0.165	0.045	0.000

5. Discussion of results

This research examined the AI features which includes these independent variables; perceived anthropomorphism and perceived intelligence and their impact on customer satisfaction. And as for the mobile banking characteristics which includes the other independent variables; ease of use, service speed, security and information content and their impact on customer satisfaction in the online banking sectors in Egypt. Results proved that hypothesis 1 was rejected. While hypothesis 2, hypothesis 3, hypothesis 4,

hypothesis 5, hypothesis 6 was accepted which had a positive significant impact on customer satisfaction.

Since AI features reflect the progression of M-banking to intelligence and anthropomorphism. This research offers a comprehensive model using to measure the impact of AI features and M-banking characteristics on customers' satisfaction towards using M-banking applications from the viewpoint of social support theory. This research found that AI features isn't considered as a strong indicator to affect the customer satisfaction. While the M-banking characteristics proved that it is stronger indicator than the AI features on customer satisfaction. However, little or some researches have discussed that AI features, so according to Lin & Lee (2023); Chi & Hoang (2023) they examined and concluded that AI features has a positive significant impact on customer's satisfaction. And as for this research, the outcomes agreed on the previous results and it was constant with it, that AI features has positive significant impact on customer satisfaction (Umamaheswari & Valarmathi, 2023).

According to hypothesis 1, the research results showed that perceived anthropomorphism had a weak relationship with 95% confidence level between customer satisfaction and the second level analysis showed that it has insignificant impact on customer satisfaction. In the marketing perspective, this means that people (customers) believe and agreed that AI-robot in chatting or any conversation that supported by M-banking apps doesn't perform

as a human or doesn't feel similar to interacting with a real person. They also agreed that AI-robot or AI in general makes people feel that it's an artificial thing and nothing should not have compared with a real human. In addition, AI-robot is not that friendly like interacting or dealing with a real human being in the physical branch of the bank. As well as, they also don't feel that much considered while dealing with AI-robot. Therefore, hypothesis 1 in this research was rejected. However, previous researchers Lin & Lee (2023); Malhotra & Ramalingam (2023); Kim & Im (2023); Chi & Hoang (2023); Karimova & Goby (2021) proved that perceived anthropomorphism has a positive significant impact on customer satisfaction.

As for hypothesis 2, this research showed that perceived intelligence had a moderate relationship and a positive significant impact on the dependent variable customer satisfaction. This means that people (customers) believe that AI-robot in M-banking is an intelligence one. And that customers are satisfied with this service as they agreed that AI through M-banking can understand their commands, communicate in way they understand and AI is that much intelligent to set tasks by itself in anticipation of future customer needs as well. In addition, previous researchers also proved that perceived intelligence has positive impact on customer satisfaction (Prentice et al., 2020); (Lin & Lee, 2023); (Irimia-Diéguez, 2023); Moussawi et al. (2020); (Hossain et al., 2020); (Akter et al., 2019).

Because the researcher found a research gap in the context of the AI features and that it may not be enough to be measured on the satisfaction towards the online banking sector. So in order to contribute in this research, M-banking characteristics is found to be a measurable factor towards the satisfaction of the customers. The researcher also wanted to examine which of the AI features or M-banking characteristics will have a strengths impact on customer satisfaction. So the researcher proved that M-banking characteristics.

In addition, the results showed in hypothesis 3 that it had a significant moderate relationship with customer satisfaction at 0.05 significance level. Ease of use also had the strongest impact on customer satisfaction than the other variables. This means that customers prefer to use M-banking applications instead of visiting the physical branch and face a hassle service with the customer service or facing any trouble issue there. According to previous literature, Ayinaddis et al., (2023) found a favorable correlation between customer satisfaction and how simple it is to ease to use mobile banking applications. The study also discovered that responsiveness and the quality of the feedback all influence how easy it is to use; usefulness is influenced by both efficiency and ease of use; responsiveness significantly affects efficiency. Another literature Alonso- Dos- Santos et al., (2020) stated that mobile banking's ease of use involves simplifying transactions and reducing the number of steps needed to

complete routine operations. For instance, a streamlined procedure for paying or transferring money lowers consumer effort and increases satisfaction (Malaquias & silva, 2020).

In hypothesis 4, results showed that it had a moderate relationship between the two variables and that service speed had a positive significant impact on customer satisfaction. Which indicates how customers interact with any thing provided by service speed, showing how customers' expectations for quick service, simple transactions increase if they are provided by a fast service instead of delays facing in the physical branch of the bank. An evidence supported by Kumar et al., (2022), there is a considerable impact of digital banking on consumers' assessments of their service experiences. The study determined which aspects of digital banking are most important in influencing banks' financial performance. According to the study, functional clues (functional quality, trust, and convenience), mechanic clues (website qualities, perceived usability, and design), and humanic clues (customer complaint handling) all influence the customer experience (CE) which automatically impacts their satisfaction.

According to hypothesis 5, results showed that it was accepted, while there was a moderate relationship between the variables and that security had a positive significant impact on customer satisfaction. This means that customers using mobile banking, security is the most crucial element for them. As

customer satisfaction is a reasonable predictor of customer loyalty, and the most significant factor in fostering customer satisfaction is perceived trust. Furthermore, Smith et al., (2020) explained that the security in mobile banking affects more than just a customer's delight; it also has an influence on their loyalty and long-term retention. Customers are more likely to keep their banking ties and show loyalty to the financial institution when they experience the advantages of safe mobile banking. In the era of online reviews and social media, when consumers are eager to share their experiences, this is especially true (Zhou et al, 2021). According to Kumar et al., (2022) safe mobile banking increases customer satisfaction and increases the possibility that they would refer the financial institution to others.

Regarding hypothesis 6, results proved that it was accepted as information content had a positive significant impact on customer satisfaction and had a moderate relationship. Recent studies have emphasized the importance of information content in mobile banking apps and how it affects customer satisfaction directly. According to research by (Klein & Martinez, 2022); Martínez-López & Young (2022) consumers' perceptions of the value, trust, and overall satisfaction of mobile banking apps are positively influenced by informative and high-quality content, such as concise descriptions of financial services. The study highlights how much more customer satisfaction can be achieved with a thoughtfully planned content strategy that takes user wants and

preferences into account. As well as, transactional efficiency is the ability of a consumer to visit a website, find the needed goods and information related to it, and check out fast (Almazroi, 2023).

5.1. Theoretical contributions

This paper provides some theoretical contributions. For instance, it focuses on the AI features in the M-banking services on customer satisfaction. However, the academic literature found a research gap on examining the AI studied variables and some of the M-banking characteristics variables as well.

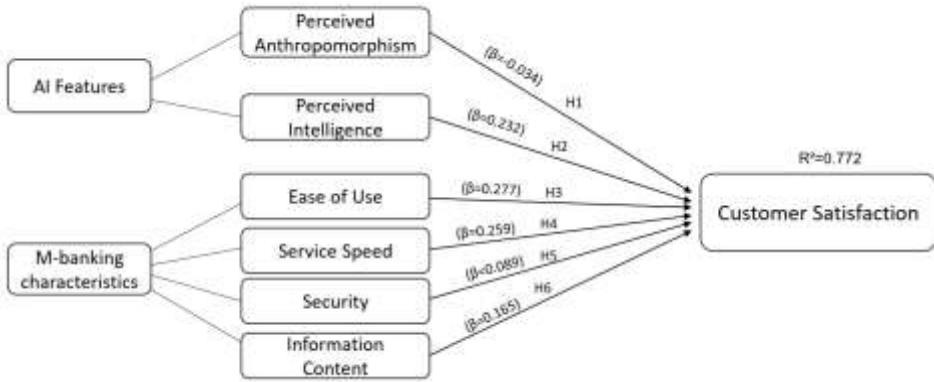| Table 5. Discriminant validity of the studied variables							
	CS	EU	IC	PA	PI	S	SS
CS	0.905						
EU	0.816	0.874					
IC	0.793	0.779	0.900				
PA	0.650	0.680	0.609	0.834			
PI	0.738	0.711	0.674	0.841	0.873		
S	0.775	0.817	0.763	0.611	0.702	0.887	
SS	0.736	0.739	0.690	0.530	0.606	0.719	0.891

Figure 2. Empirical study results

This research aims to identify that AI features which includes these independent variables; perceived anthropomorphism and perceived intelligence and their impact on customer satisfaction. And as for the mobile banking characteristics which includes the other independent variables; ease of use, service speed, security and information content and their impact on customer satisfaction in the online banking sectors in Egypt.

This study showed that perceived anthropomorphism had a weak relationship and insignificant impact on customer satisfaction which means that customers don't agree that AI-robot and AI in general is friendly like interacting or dealing with a real human being in the physical branch of the bank. As well as, they also don't feel that much considered while dealing with

AI-robot. So that perceived anthropomorphism is rejected. While the other variable perceived intelligence has moderate relationships and positive significant impact on customer satisfaction which means that using AI in M-banking makes customers satisfied as they agreed that M-banking can understand their commands, communicate in way they understand and AI is that much intelligent to set tasks by itself in anticipation of future customer needs as well. In addition, results showed that M-banking characteristics variables; ease of use, service speed, security and information content positively impacted their satisfaction as the study investigated that these variables have stronger effect than the AI features.

H1: There is a positive insignificant impact of perceived anthropomorphism on customer satisfaction

H2: There is a positive significant impact of perceived intelligence on customer satisfaction

H3: There is a positive significant impact of ease of use on customer satisfaction

H4: There is a positive significant impact of service speed on customer satisfaction

H5: There is a positive significant impact of security on customer satisfaction

H6: There is a positive significant impact of information content on customer satisfaction

5.2. Managerial implications

As per the study results which showed the strength of M-banking characteristics and services by using AI features. So accordingly, marketers should be looking for innovative ways to their customers who have been up-to-date and open to technology acceptance. They also should consider that user-friendly features should be given top priority by financial institutions in order to increase consumer satisfaction in Egypt's mobile banking industry. Ease of use was the highest effect on customer's satisfaction, followed by the information content then service speed as these are crucial preferences that customers are searching for. So in order to insure this in the mobile banking application, it should be consisting of simple user interface design, easy navigation, and clear information. As well as using chatbots and virtual assistants powered by AI to facilitate hassle-free services or interactions and make sure all features and functionalities are readily available. Financial institutions should make significant investments in strong security measures, considering the significance of security in the context of mobile banking. Results showed that M-banking security had a positive significant impact and weak relationship with customer satisfaction, but with a lower impact than the other characteristics. So this entails putting encryption, multi-factor authentication, and continuous monitoring in place to identify and stop fraudulent activity. Openly explain these security

precautions to customers in order to foster trust and increase customer satisfaction. As well as, service speed is an important factor in determining customer satisfaction by avoiding transaction periods or delays. So marketers need to make sure that their system infrastructure and AI algorithms are set up for quick and easy transactions. Reduce loading times and wait times to give Egyptian consumers a smooth and effective mobile banking experience.

In conclusion, banks must prioritize features that are easy to use, strong security, quick transaction times, reliable or personalized information content and feedback, and instructional programs. Banks can foster increased customer satisfaction and competitiveness in Egypt's dynamic mobile banking market by streamlining customer experiences, protecting data, streamlining transactions, personalizing information, actively seeking feedback from customers, and educating customers about AI capabilities.

6. Research limitations and suggestions for further research

Researcher decided to use non-probability convenience sampling technique by selecting only users of mobile banking applications "bank-related" due to convenience and time limitations not the other financial services which are recently invented to facilitate the banking transactions. In addition, researcher decided to do google form to facilitate the data collection process and to reach customers quickly. Another limitation of this research, there was a limited time to complete the research, gathering the responses and

complete the writing process. According to this, the researcher didn't use the qualitative data by doing an exploratory research due to time limitations.

Further research can examine the impact of AI features on behavioral intention towards the new financial services such as Telda or Instapay. Also further research can study the relationship and impact of technology acceptance model (TAM) on behavioral intention towards using mobile banking applications that is supported by other AI features as well. Also further research may study the impact of demographics as a moderator effect to know which level or category in the demographics will be change or affect the behavioral intention by measuring AI features and M-banking characteristics as independent variables.

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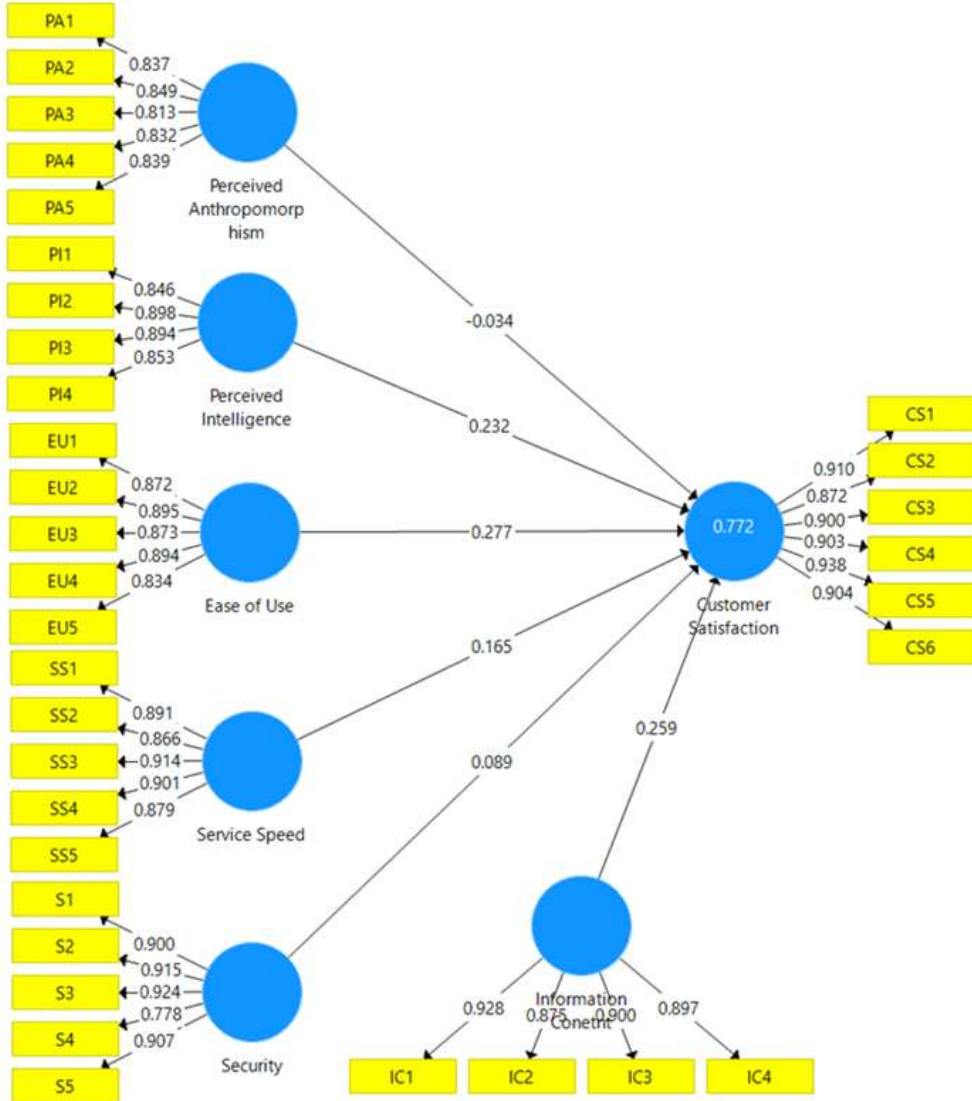
Appendix 1

Figure 3: SmartPLS output