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Uncertain Supply Chain Management

Utilizing Artificial Intelligence (AI) in enhancing customer-supplier relationship: An exploratory study in the banking industry

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A B S T R A C T

This study provides a comprehensive overview of the field of enhancing the customer-supplier relationship through big data technology and artificial intelligence (AI), reveals existing gaps and offers promising solutions for future research. SMART PLS-4 software was used to analyze the data collected, the results led to the existence of significant relationships between artificial intelligence and enhancing the relationship between the supplier and the customer (customer interaction, customer communication, customer participation, customer learning, customer experience, customer feedback). The study contributes to developing a conceptual model through the application of artificial intelligence in managing customer relationships with suppliers in the banking industry. The study contributes to developing a conceptual model through the application of artificial intelligence in managing customer relationships with suppliers in the banking industry setting. Which supports increasing knowledge in this field and helps managers develop appropriate strategies. This research is the first of its kind to organize and discuss the literature related to using artificial intelligence within the customer-supplier relationship management setting, which provides great importance to the process of using and developing artificial intelligence technology and understanding recent trends in how to develop customer–supplier relationships within the technology era.

1. Introduction

In the introduction to the study, the importance of the relationship between the supplier - customer is addressed by collecting data and managing it thanks to technical solutions, with the aim of developing customer relationships and achieving an exceptional customer experience (Boulding et al., 2005). Previous research shows that collecting data from various touchpoints with customers and through customer opinions can support banks' activities in producing customized marketing responses and generating new ideas, creating services that better meet customers' expectations, which enhances the provision of how to add values to customers and achieves a competitive advantage in the banking sector. Within this digital age, technological revolution such as AI techniques plays a critical role in developing the business activities these days (Brynjolfsson and McAfee, 2017). Artificial intelligence refers to the ability to understand and analyze data effectively and give realistic results that touch the truth to achieve specific goals more accurately (Kaplan & Haenlein, 2019). The current research highlights how the banking sector is working to develop and enhance the customer relationship through artificial intelligence technology, which reflects the importance of this activity in the current digital transformation of banks**.**

As the global competition among the banking sector has intensified considering their use of advanced methods and the attempt to keep pace with rapid development, this imposes on companies the necessity of adapting to that environment quickly, whether through dealing with suppliers or meeting customer needs. In this context, the use of artificial intelligence technology between appropriate suppliers and customers helps in providing resources efficiently and ensuring quality services (Brynjolfsson and McAfee, 2017). Rapid advances in information technology are now being used to improve operational effectiveness and build new capabilities to meet the challenges of today's business environment. Thus, top management can face difficulties in choosing the most appropriate methods at the global level. Customer Relationship Management (CRM) has become a pressing necessity in a competitive business environment, where these are suppliers worth millions of dollars. In an increasingly competitive banking sector, customer satisfaction and strengthening customer relationships are vital to the success of any organization. With increasing customer demand and expectations for high-quality services as declared by Pearson (2019), CRM can provide fast and efficient transactions to help banks serve, attract, increase, and retain numbers of customers. Also, banks can enhance customers' direct interaction with them and provide customized services to enhance trust and loyalty among customers. Systems using CRM are bursting with advances in AI technology applications, and these applications are becoming essential to staying within the context of supplier CRM (Pearson, 2019). In fact, new CRM features, such as customer's interaction, customer's communication, customer's engagement, customer's learning, customer's experience, customer's feedback, require big data to process in real time, which would be easy to implement with AI technology (Pearson, 2019). Besides the importance of AI in the business world, academia also points out that AI represents the next step towards new and more effective CRM (Kumar et al., 2020; Vignesh and Vasantha, 2019). Since CRM "is the result of the continuous evolution of the marketing ideas, data, technologies and newly available organizational forms" (Boulding et al., 2005), AI has played a fundamental role in improving the performance of banks by applying artificial intelligence solutions to manage customer relationships with suppliers. This includes understanding and analyzing customer data better (Brynjolfsson & McAfee, 2017). Researchers are increasingly able to anticipate, plan for, and capitalize on future opportunities (Mishra & Mukherjee, 2019). Despite the spread of artificial intelligence in administrative contexts, research in this field has not received much attention from management scholars during the past two decades (Raisch & Krakowski, 2020). The literature on AI has developed primarily through two separate disciplines: computer science and operations research that focuses on operational tasks that machines can handle, and organization and management research that analyzes managerial tasks assigned to humans. In recent years, awareness of the importance of AI and its potential impact on managing customer relationships with suppliers has increased, leading to an increase in research publications and the accumulation of knowledge on this topic (Schroeder et al., 2021). This increase is also due to the existence of multiple definitions of CRM. Accordingly, the relationship between AI and CRM with suppliers is a topic studied from multiple perspectives, whether strategic, operational or within an information systems framework (Richards & Jones, 2006; Khodakarami & Chan, 2014). This diversity of perspectives leads to advances in research in different fields, creating challenges in knowledge exchange and cooperation between different disciplines (Loureiro et al., 2021). In addition, while CRM encompasses service, marketing, and operations activities, their common jobs have made AI and CRM research more important across different entrepreneurship fields. On this basis, it is shown that organizing the literature on AI in CRM into a complete body of structured knowledge may be beneficial to both the business world and the academic sector. This can guide managers and inspire future researchers' research. Although previous reviews in this field have focused on the applications and challenges of big AI and data in customer journey modeling (Chatterjee et al., 2019; Arco et al., 2019), the potential impacts of big data and AI, and the key success factors for CRM (Zerbino et al., 2018) and consumer decision making (Klaus & Zaichkowsky, 2020), but there is a continuing need for a comprehensive review focusing on AI in supplier relationship management. In order to maintain the level of quality, manufacturers find themselves in dire need to enhance their competitive capabilities by focusing on the modern technologies used. This growing trend is reflected in building close and collaborative relationships with customers where, through superior performance, these suppliers can rise to a higher level of competitiveness and success. As banks become able to focus primarily on customer needs, and contract with the appropriate suppliers to achieve complete satisfaction of these customers. Hence, the selection of suppliers becomes a crucial element in the success of any financial institution in attracting customer satisfaction and achieving success in the market. AI technology plays an important role in enhancing the relationship between the supplier and the customer by increasing the efficiency of customer's interaction, customer's communication, customer's engagement, customer's learning, customer's experience, and customer's feedback. As commonly used concepts, have an important role in selecting suppliers and thus increasing the bank's competitive advantage. Based on this introduction, this paper aims to explore and track the state-of-the-art in the field of AI techniques in managing customer relationships with suppliers, thus identifying emerging topics for future research. For this purpose, the authors conducted a systematic, transparent, and replicable review of how using AI in managing customer relationships with suppliers better, using the Smart Pls-4. Mainly, the current study combines AI technology in enhancing and developing the relationship between the supplier and the customer by knowing the customer's impression about many essential aspects of mutual relationship which are: the customer's interaction, customer's communication, customer's engagement, customer's learning, customer's experience, and customer's feedback, leading comprehensively, allowing the construction of structural images of the research field. The banking industry is witnessing remarkable development considering the advancement of technology and the increasing use of AI, as the role of AI extends beyond simply automating processes. The banking sector is considered one of the most important sectors in the economy, due to its multiple activities such as financial transactions, deposit transactions, loans, and asset management. For example, a study by Furst, Lang, and Nolle (1998) indicated that AI could contribute to the productivity of banks through the implementation of process improvement techniques and financial services. For its part, Gartner (2017) confirmed that AI is impacting the banking industry by creating new products and

services, increasing efficiency in operations while reducing the time spent. The Infosys (2017) study highlighted several areas where AI can impact the banking industry, such as improving customer service through intelligent digital assistants, improving fraud management through machine learning and pattern recognition techniques, and improving the delivery of financial services via digital channels. Although it is possible to improve banking services and provide innovative products using AI, there are multiple challenges facing the process of adopting and deploying these technologies in the banking industry, and this requires thoughtful strategies to realize the full benefits of this technological development. To add more, it is observed that technological innovation, including AI, has become essential for the development of banking systems and the creation of value for banks and their customers (Akour et al., 2024; Alshurideh et al., 2024). Studies indicate that AI can give banks the ability to offer innovative products, and this is considered a focal point in business growth especially within banks' marketing strategies (Nuseir et al., 2024). Our study contributes to the development of the field of artificial intelligence in customer relationship management with suppliers (Donthu et al., 2021), and addresses important new directions for future research. The rest of the paper will be organized as follows. Section 2: The literature presented in this study in addition to the study hypotheses. Section 3: Methodology This section describes the methodological framework followed in the study, including the research strategy adopted and data collection processes. Section 4: Results This section presents the results obtained during the study, With the analysis and visualizations necessary to understand these results. Section 5: Conclusions and discussion and limitations and implications for future research in section 6. This section discusses the most important contributions made in the study, in addition to identifying possible future paths of research in this field. Thus, the rest of the paper is arranged and organized in a way that makes it easier for readers to follow the general structure of the study and clearly understand the content of each section.

Hence, the objective of this study is to address the subsequent research inquiries:

 (1) How to enhance the relationship between the supplier and the customer using AI, especially within the banking sector, (2) What role does AI plays in the following: customer's interaction, customer's communication, customer's engagement, customer's learning, customer's experience, and customer's feedback?

2. Literature review

2.1 Enhancing customer-supplier relationship

Strengthening relationships between customers and suppliers is vital to fostering mutual trust and promoting long-term cooperation and success. By focusing on effective communication, transparency, and rapid response, both sides can better understand each other's needs and expectations, leading to the development of customized solutions and services that meet the unique requirements of the customer while the supplier can improve their offerings. Additionally, investing in technologies such as Relationships between customers and suppliers can be strengthened by improving customer service management, enhancing data exchange, and improving overall efficiency (jean et al., 2010). Ultimately, the enhanced relationship between customers and suppliers contributes to enhancing innovation, enhancing loyalty. On the other hand, research in the field of customer relationship management (CRM) addresses several aspects such as key and strategic account management, which has been studied through research such as (Arantola, 2006; Björn & Parvinen, 2006; Lane & Piercy, 2004), in addition to methodologies and practices in customer relationship management, which have been studied through research such as (Chalmeta, 2006; Madill et al., 2005), and also customer value creation and value drivers, which have been studied through research such as (Golfetto & Gibbert, 2006; Richards & Jones, 2006), and customer segmentation practices, which have been studied through research such as (Jonker et al., 2004; Kim et al., 2006). Understanding the concept of customer relationship management (CRM) is a broad topic, discussed in numerous studies (Choy et al., 2004; InJazz & Popovich, 2003; Richards & Jones, 2006). Additionally, according to Herman and Hodgson (2002), supplier relationship management (SRM) can be depicted as a process that allows a company to manage preferred suppliers and discover new ones while minimizing costs, organizing repeatable and predictable purchases, and exploiting past experiences and partnerships. Supplier relationship management can also be understood as a process capable of capturing and creating value within an organization. Rather than seeing supplier relationship management as just part of the procurement function.

2.2 The role of artificial intelligence in the banking industry

The latest technical innovations, such as artificial intelligence, cloud computing, machine learning, big data analytics, as well as social media, have revolutionized digital business and fundamentally transformed how we interact with technology and the world around us., enhances processes, and improves efficiency and ability to meet future challenges (Tekik & Korotev, 2019). The capabilities of artificial intelligence facilitate its applications in many ways. It can predict events through audio and text processing and computational language analysis of the surrounding environment, relies on understanding meaning and language through natural language processing, and helps humans interact with machines through AI-related algorithms. In addition, intelligent software systems can operate autonomously without human intervention (Ottosson & Westling, 2020). Moreover, AI can fully enhance itself over time thanks to its ability to self-learn through past experiences (Oztumel & Gursev, 2020). New digital solutions always change the competitive strategies used in businesses and contribute to the development of new methods of value creation (Shang & Zhang, 2022). The feasibility of using chatbots in the banking industry is increasing. For example, chatbots that rely on natural language technology are used to solve user problems (Sohil et al., 2020). The use of these AI in the financial sector has changed the way problems are solved and customers' inquiries are answered (Hwang & Kim, 2021). AI understands written and spoken texts, can answer ambiguous questions and communicate with

other online databases or portals (Nguyen et al., 2021). On the other hand, artificial intelligence literally handles large numbers of incoming calls from customers and enhances their satisfaction, perceptions, and confidence in banking services about their usefulness. (Patel & Kulkarni, 2019). It also manages more accounts than human advisors with lower operational costs and maximizing profits (Wheeler, 2020). 24/7 online appraisal AI provides greater flexibility in operations and reduces the use of physical bank branches (Keh, 2019). In general, modern technologies based on artificial intelligence contribute to enhancing and simplifying the process of making decisions and adhering to regulations and can reduce false contracts and improve resource forecasting.

2.3 Development of Hypotheses

2.3.1 The Impact of AI on customer's interaction

Artificial Intelligence (AI) is transforming service interactions in multiple, unprecedented ways. These interactions between customers and businesses are diverse, ranging from fully automated interactions (such as the interaction between customer and device) to traditional interactions enhanced by AI (such as the role of the customer's human agent being augmented by AI). The service literature is focused on applications of artificial intelligence that are reshaping service interactions and customer and firm strategies. The research also focuses on the impact of AI interactions on enhancing the supplier-customer relationship. In the current context, Hollebeek (2018) called for research on "how companies can successfully increase the capabilities of their employees and enhance service productivity across the board." Hollebeek (2018) argued that there is an active role for factors related to interaction technology in enhancing customer and company value resulting from these automated interactions. This study responds to these calls by exploring how interactions between customers and suppliers can be enhanced using AI in the context of call centers, investigating whether this is possible and if the resulting interactions lead to customer satisfaction, loyalty and engagement. With these findings in mind, we hypothesize:

H$_1$: *Artificial intelligence (AI) use positively influences customer's interaction.*

2.3.2 The Impact of AI on customer's communication

The scientific community's growing interest in artificial intelligence has not yet reached the desired level in the field of communications management. Our study is the first quantitative study in this field of employing artificial intelligence technology and was the first attempt to put it on the agenda of public relations and marketing research between customers and suppliers. Two ideas are particularly relevant to the profession: communicators need to learn about artificial intelligence; Communications leaders must realize their responsibility to apply artificial intelligence in their management and benefit from this technology. When asked about the perceived impact on However, we detailed a cognitive bias like the 3rd person effect in media influence (Davison, 1983) practitioners expect significant changes caused by artificial intelligence in the profession – but not in their lives. Private institutions, as it is less important for them personally. This can also mean that experts and specialists have discussed this topic in relevant scientific journals. But have not seen any application of AI in their organization, department, agency, or in their personal daily use. The same applies to academia:

H$_2$: *Artificial intelligence (AI) use positively influences customer's communication.*

2.3.3 The Impact of AI on Customer's engagement

Studies show that customer engagement is highly related to service quality, and this relationship has been considered an effective strategy to increase profitability and gain competitive advantage for a long time (Alvarez-Milán, et al., 2018; Wang et al., 2021). Previous research has demonstrated that the use of new technologies can be a driver of customer engagement and enhance customer loyalty (McKnight & Chervany, 2001; Kosiba et al., 2020). AI has been applied in enhancing the supplier-customer relationship, as it refers to applications or smart devices that rely on its technologies to reduce costs and improve customer experience. For example, employees use smart devices such as thermostat, lock, and home assistant to deliver services more efficiently and improve customer experience. AI can also enhance the relationship through identity verification and background checks, providing a differentiated service experience. Based on these insights, we propose the following hypothesis:

H$_3$: *Artificial intelligence (AI) use influence positively customer's engagement*

2.3.4 The Impact of AI on customer's learning

Artificial intelligence plays an important role in various areas of human life, including the educational field, where research and practice can be divided into two partially overlapping branches: teaching with AI and teaching about AI (Carvalho et al., 2022; Williamson & Einon, 2020). The first branch uses AI as a tool for education through applications such as predictive learning analytics, personality, and auto-facial (Leaton Gray, 2020; Raffaghelli et al., 2022). The second branch approaches artificial intelligence as the essence of education and the goal of learning and includes concepts of literacy in the field of artificial intelligence (Jandri´c, 2019; Long & Majerko, 2020; Su et al., 2022). One common goal in the field of artificial intelligence involves helping individuals form accurate understandings of the field (Kreinsen & Schulz, 2021; Touretzky et al., 2019). About banks, the increasing customer demands for quality and innovation in services put them under pressure, and the competitive process forces them to strengthen the relationship between customer and supplier. Therefore, banks should

use modern technologies such as artificial intelligence to improve customer engagement and gain more competitive advantage, which contributes to achieving the desired goals. we propose the following hypothesis:

H₄: *Artificial intelligence (AI) use positively influences customer's learning.*

2.3.5 The Impact of AI on customer's experience

In 2018, customer experience expert Blake Drews-Morgan analyzed three areas where AI is positively impacting customer experience. First, note that many customers enjoy interacting with virtual assistants during or after purchases. Second, personalization services have proven effective when customers make purchasing decisions. Finally, AI provides in-depth insights about customers, helping companies develop tailored strategies (Morgan, 2018). On the other hand, a study conducted by InMoment (2018) revealed that 75% of customers feel intimidated by targeted ads. Customers who feel that their experience is being monitored via the web can show negative reactions, as a study by Mannino et al. (2015) showed the potential risks of using AI in business. The development of technology can reduce employment opportunities in a wide range of industries, indicating the need for strategies to improve the customer experience. With ever-increasing customer expectations, customer experience has become a tough challenge for businesses. Companies seeking to achieve a competitive advantage in customer service must seek new strategies to address common customer vulnerabilities during the purchasing process and provide effective customer service. For example, customer experience can be improved by offering personalized data and personalized support to each customer. Based on these ideas, we suggest:

**H₅:** *Artificial intelligence (AI) use positively influences customer's experience.*

2.3.6 The Impact of AI on customer's feedback

Customer feedback analysis is a powerful tool for gaining valuable insights into their feelings, needs and preferences, and gives businesses the opportunity to improve their operations, enhance customer experiences and achieve growth. Customer feedback analysis can extract useful information from vast amounts of data, which faces challenges in traditional manual implementation in terms of speed, accuracy, and scalability (Nobar & Rostamzadeh, 2018). AI is coming to change the rules of the game in customer feedback analysis. Analyzing responses using AI represents a revolution in how companies leverage data, allowing them to unlock deeper insights, make data-driven decisions, and gain a competitive advantage. This analysis relies on advanced techniques As specialists in the field of language processing and machine learning have studied and analyzed a large number of customer comments efficiently and accurately (Nobar & Rostamzadeh, 2018). Through AI-powered tools and systems, businesses can automatically rank and prioritize customer feedback services based on sentiment, uncover emerging trends, and identify actionable insights. These technologies also enable companies to understand customer preferences and pain points, proactively address issues, and deliver exceptional customer experiences (Nobar & Rostamzadeh, 2018). Modern AI sentiment analysis techniques go beyond just tracking keywords, allowing companies to measure the true sentiment behind customer reviews by analyzing the tone, context, and language used, enabling them to detect subtle sentiments and uncover hidden patterns and sentiments that may have previously been overlooked (Nobar & Rostamzadeh, 2018). we hypothesize:

H₆: *Artificial intelligence (AI) use positively influences customer's feedback.*

2.3.7 The study model

Based on the above claims, the study model can be drawn as shown in Fig. 1:
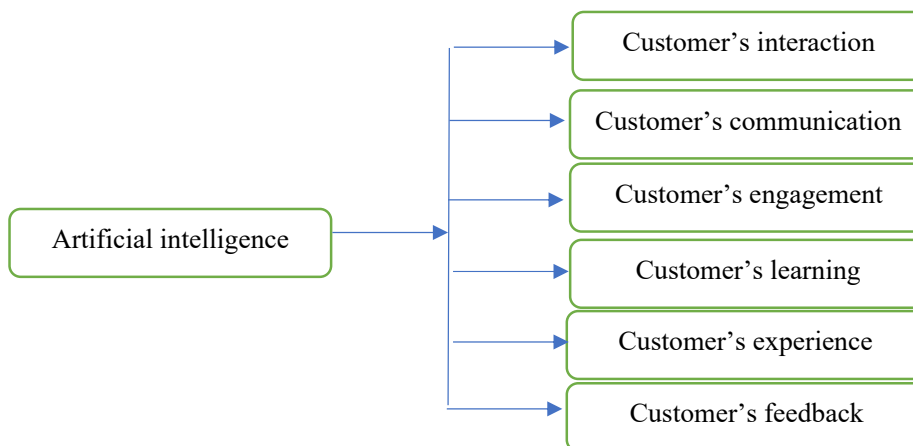
Fig. 1. The study model

3. Methodology

To achieve the goal of the research, we reviewed the literature along with conducting statistical analysis using "The analysis included mathematical and statistical analysis of data collected from the banking sector" (Pritchard, 1969), The impact of the AI variables on strengthening the relationship between the customer and the supplier. The first stage of the research method is related to reviewing a group of articles related to AI and collecting data for the purpose of analyzing it and knowing the extent of the impact of AI technology on managing customer relationships with suppliers (McCain, 1990). The second stage uses creating a path analysis and showing the study model.

3.1 Population and Data Collection

This research aimed to understand the role of AI in enhancing the relationship between customer and supplier. A group of (350) clients were included in this study. A special questionnaire was designed to collect data and was distributed electronically. The final sample included (338) participants representing various groups and backgrounds.

3.2 Study Instrument

In this study, previous research and studies related to the research topic were studied, and it benefited from subsequent studies related to the topic that were reformulated. The research instrument was developed by conducting a field survey using a questionnaire specifically designed for this plant. The questionnaires include a list of written questions that are given to participants, which they return to the researchers. The use of questionnaires helps in systematic data collection, through which results can be recorded over the entire population when using representativeness of the target population (Rattray & Jones, 2007).

The researchers administered and collected questionnaires from participants using Google Forms. Participants were asked to provide accurate answers to all questions, whether open or closed. The questionnaire included the variable the relationship between the customer and the supplier (as an independent variable) and the variable AI (as a dependent variable). A five-point Likert rating was used to evaluate the answers to the questions, where the possible options were: (strongly agree, 5 to strongly disagree, 1).

4. Results

This section presented the results of the study that were reached by analyzing the study data using SPSS 26 and Smart PLS. The first section includes a presentation of descriptive statistics of participants' demographic data, while the second section includes testing the study hypotheses using simple linear regression analysis.

4.1 Demographic data for respondents

The following table presents descriptive statistics for respondents' demographic data including the frequency and percentage for each of them:

Table 1
Descriptive statistics of demographic data for respondents

Variable	Category	Frequency	Percent
Gender	Male	212	62.7
	Female	126	37.3
Age	Less than 25 years	24	7.1
	25–40years	131	38.8
	41-55 years	106	31.4
	More than 55 years	77	22.8
Education	College	76	22.5
	University	209	61.8
	Master's degree	43	12.7
	PHD	10	3

The results in the table above show that males in the study sample constituted (62.7%) of the total number of participants, while the percentage of females was (37.3%) of the total number of participants in the study. Regarding the age groups of participants, the largest percentage was in the age group between 26 and 40 years, as their percentage reached (38.8%) of the total study sample. The data also showed that most study participants hold university degrees (61.8).

4.2 Internal Consistency of Reliability

Internal consistency of reliability is an important index used to measure the degree to which all components of a given scale measure the concept of that scale (Sun et al., 2007). In the context of organizational research, Cronbach's alpha coefficients and composite reliability are common tools used to estimate the composite reliability and internal consistency of a scale, especially when the scale contains multiple items (Peterson & Kim, 2013). In this study, it was found that Cronbach's alpha-based reliability coefficient is used to evaluate the internal consistency of modified scales for several reasons. Researchers

argued that the composite reliability coefficient provides a less biased estimate of reliability than Cronbach's alpha. This is because Cronbach's alpha assumes that all indicators contribute to the original construct simultaneously.

Table 2
Reliability and internal consistency results

Factor	Item Name	Factor Loading	Cronbach's Alpha >.7	Composite Reliability (Cr) >.7	AVE >.5
INT	INT1	0.790	0.82	0.88	0.648
	INT2	0.849			
	INT3	0.757			
	INT4	0.820			
COMM	COMM1	0.801	0.863	0.907	0.71
	COMM2	0.873			
	COMM3	0.836			
	COMM4	0.82			
ENGA	ENGA1	0.874	0.875	0.914	0.728
	ENGA2	0.889			
	ENGA3	0.853			
	ENGA4	0.794			
EDU	EDU1	0.858	0.803	0.883	0.716
	EDU2	0.846			
	EDU3	0.836			
EXP	EXP1	0.837	0.882	0.919	0.738
	EXP2	0.86			
	EXP3	0.881			
	EXP4	0.858			
FEED	FEED1	0.783	0.875	0.914	0.728
	FEED2	0.919			
	FEED3	0.891			
	FEED4	0.812			
IA	IA1	0.786	0.893	0.919	0.655
	IA2	0.7			
	IA3	0.795			
	IA4	0.84			
	IA5	0.872			
	IA6	0.855			

Without considering the individual contributions of each component. In addition, while Cronbach's alpha can underestimate or overestimate the reliability of a measure, composite reliability acknowledges differences in item loadings in the model, like Cronbach's alpha but with a more nuanced interpretation. Table 2 and Fig. 2 show that the composite reliability coefficients for the study structure indicate that the internal consistency of the latent variables was satisfactory, as they all exceeded the minimum acceptable level of 0.70. As Table 2 and Fig. 2 show, the composite reliability coefficients for the study constructs indicate that the internal consistency of the latent variables was satisfactory, as they all exceeded the minimum acceptable level of 0.70.

4.3 Discriminant Validity

Discriminant validity is a form of validity that signifies the measurement model of a construct is devoid of redundant items, demonstrating that a construct is distinct from other constructs by empirical standards (Fornell & Larcker, 1981). To assess discriminant validity in Smart-PLS, various criteria are employed, with Fornell and Larcker being one of the widely used methods. The details of this method will be discussed in the following section.

4.4 Variable correlation using the Fornell–Larcker criterion.

Table 3 presents the results of the multivariate correlation analysis using the Fornell-Larcker approach to evaluate the discriminant validity of the measurement model. According to the method outlined by (Fornell and Bookstein, 1982), discriminant validity is determined when the square root of the average variance extracted (AVE) is greater than the correlation between the factors that make up each pair. In other words, the AVE values must exceed other off-diagonal relationships in the rows and columns, which is what the correlation matrix represents in this study. These results indicate discriminant validity of the terms of the predictor variables (Fornell & Bookstein, 1982).

Table 3
Reliability and internal consistency results (continuation)

	COMM	EDU	ENGA	EXP	FEED	IA	INT
COMM	0.842						
EDU	0.78	0.846					
ENGA	0.793	0.785	0.853				
EXP	0.783	0.803	0.746	0.859			
FEED	0.714	0.628	0.682	0.785	0.853		
IA	0.652	0.524	0.526	0.557	0.712	0.809	
INT	0.842	0.664	0.658	0.729	0.633	0.562	0.805

*4.5 Hypotheses Testing (Path Coefficient)*

This section discussed the findings of the path coefficient used to test research hypotheses. The finding of direct effect hypotheses of the AI in enhancing customer-supplier relationship (H1, H2, H3, H4, H5, H6), presented in Fig. 2, and Table 4.

Table 4

Hypothesis testing of model

	original sample(O)	sample mean	STDEV	T statistic	P value	
IA→COMM	0.441	0.456	0.050	8.794	0.00	Supported
IA→EDU	0.312	0.333	0.048	6.496	0.00	Supported
IA→ENGA	0.356	0.368	0.058	6.135	0.00	Supported
IA→EXP	0.478	0.486	0.070	6.841	0.00	Supported
IA→FEED	0.521	0.536	0.042	12.509	0.00	Supported
IA→INT	0.562	0.57	0.075	7.543	0.00	Supported

Notes: Significant level at α=0.05

Table 4 shows the assessment of the full model. The result of the study confirms four direct effect hypotheses which are; **H1** which is related to the impact of the IA on the Customer's interaction (beta =0. 562, P= 0.00), **H2** which formalized to examine the impact of IA on the the Customer's communication (beta =0.441, P= 0.00) and **H3** which is related to the impact of IA on the Customer's engagement (beta =0.356, P= 0.000), while the result of the study support **H4** which is related to the impact of IA on the Customer's education (beta =0.312, P= 0.00). **H5** which is related to the impact of IA on the Customer's experience (beta =0.478, P= 0.00). **H6** which is related to the impact of IA on the Customer's feedback (beta =0.521, P= 0.00).
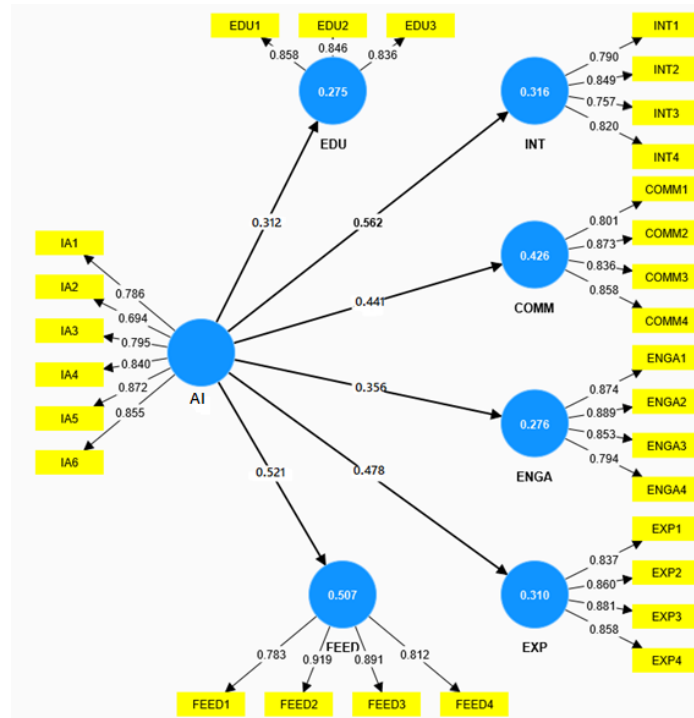
Fig. 2. Path analysis for the research model

5. Conclusions and discussion

This paper provides an overview of the multiple economic impacts witnessed in the recent period, focusing on technological development in the field of AI and its various applications such as machine learning and drawing. The study highlights the importance of the challenges facing the labor market because of the impact of AI, focusing on issues related to productivity, employment, corporate organization, and the innovation process. The study also examines how AI affects consumer behavior and market competition, by exploiting new data sources and analyzing pre-existing behavioral biases in humans. It is noted that the effects of AI on the labor market have caused prominent challenges, such as wage inequality and increased unemployment rates. This has led economists to call for policies that include changes to patents, length of term, and taxes on capital, as well as policies to support employment and universal basic income.

Despite growing concern among policymakers about the potentially disruptive impact of AI on the labor market, few studies have sufficient data on the technology used at the corporate level to evaluate the impact of artificial intelligence. The current study showed a statistically significant relationship between AI and customer reactions. On the other hand, this study added to our understanding of the meaning of AI and its impact on businesses, customers, and society in general. The main objective of this study was to examine the impact of using AI on improving the overall customer experience. During the research process, the researchers noted that the study's hypotheses regarding customer reactions matched their findings. The results of correlational and regression analysis showed that there is a positive relationship between the use of artificial intelligence and customer experience, and that there is a direct link between providing personalized customer service, after-sales customer support, and the use of artificial intelligence-based technology. Additionally, the study indicated that providing personalized customer service throughout a customer's purchasing journey has a significant impact on the customer experience. The results also showed that using artificial intelligence-based technology in call centers and after-sales support services can enhance customer experience. Last but not least, thematic analysis has shown that these uses of AI play an important role in improving customer engagement and satisfaction.

In the context of education, this study explored the concepts of AI and its relationship to customer education by analyzing the answers provided by customers in the questionnaire. The questionnaire aimed to understand the extent of the impact of AI technology on customer education, how to activate and use this technology, why it is used, and the types of terms related to it. This is the first study to provide excerpts of data that help provide a deeper contextual understanding of why strengthening the customer-supplier relationship with AI is important. Our findings showed similarities and differences compared to previous related research. For example, the results showed that AI has a statistically significant relationship with customer education. When service interactions are enhanced with AI, they become important touchpoints in the customer journey, where service companies can achieve a superior competitive advantage thanks to AI. In addition to saving costs, increasing profits, and improving process efficiency, AI serves as a strategic tool to achieve multiple goals, including customer satisfaction, enhancing the supplier-customer relationship, customer engagement as well as internal marketing goals such as service employee satisfaction. The current study showed a statistically significant relationship between AI applications and communication with customers. AI technologies contribute to enhancing communication with customers in the future. This requires communications to be prepared for this purpose, as AI technologies already contribute to communicating with customers in multiple ways. Future developments in this field require future studies that rely on diverse methods and highlight open questions to advance knowledge about AI technologies for communicating with customers and suppliers. The results of the current study showed that there is a statistically significant relationship between AI technology and communication with the customer. Regarding interaction with customers AI-powered aspects, such as sentiment analysis, voice analytics, chat, and self-service portals, provide many benefits. Organizations may use social media monitoring for surveillance And respond to customer comments and feelings in real time. By enabling exact copying and Customer conversation analysis, voice recognition, and speech analytics improve customer interactions.

They provide immediate and personalized support, while self-service portals enable this Clients to search for answers themselves. Furthermore, organizations must understand the dynamic AI environment in customer service in order to meet the customer's changing requirements and expectations. In the digital age, organizations can enhance customer enjoyment and loyalty through the use of AI technology. AI allows companies to better understand their customers' emotions, create personalized solutions, and deliver seamless customer experiences. As AI advances, more complex uses have emerged, such as enhancing emotions Analytics, predictive analytics, and increased personalization may become possible. Through this study, statistical analysis showed that there is a statistically significant relationship between AI technology and customer interaction. They provide immediate and personalized support, while self-service portals enable these Clients to search for answers themselves. Furthermore, organizations must understand the dynamic of the AI environment in customer service in order to meet the customer's changing requirements and expectations. In the digital age, organizations can enhance customer enjoyment and loyalty through the use of AI technology. AI allows companies to better understand their customers' emotions, create personalized solutions, and deliver seamless customer experiences. As AI advances, more complex uses have emerged, such as enhancing emotions Analytics, predictive analytics, and increased personalization may become possible. Through this study, statistical analysis showed that there is a statistically significant relationship between AI technology and customer interaction.

6. Limitations and implications for future research

Although the study provided useful information about the concepts of AI and its impact on the banking sectors, it suffers from some limitations. Our data were easily collected through a sampling process (see Patton, 2014). As a result, results may not be fully representative of the population and cannot be generalized to other contexts without taking into account constructive criticism. Comparative studies can provide additional information about differences in people's perceptions of AI by geographic and cultural regions. (e.g., Dang & Liu, 2021, 2022; Droga et al., 2019). In addition, the online data collection method may contain important details about customer perceptions, although it allows us to increase the number of responses.

The exploratory nature of the research design precludes our ability to explore potential links between clients' perceptions and underlying variables such as economic status, technological skills, interests, and gender of the individual or family. In research

on banking sectors, higher economic status and advanced education have generally been found to be associated with higher self-evaluation of AI (Selwyn et al., 2020). Research has also found a positive relationship between the application of digital technologies in the banking sectors and between the customer and the supplier. These results indicate that there is a strong relationship between AI technology and the development of the supplier relationship with the customer. Therefore, there is a need to explore the context of artificial intelligence to develop this relationship and benefit from this technology.

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