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ORIGINAL CONTRIBUTION

Digital Readiness and Big Data Analytics: Moderating Roles in Achieving Social Sustainability through AI-CRM and Competitive Advantage

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Abstract— By empirically examining the impact of digital technology readiness on information technology capability and the adoption of artificial intelligence-based customer relationship management (AI-CRMA), and ultimately on competitive advantage and social sustainability performance, this study adds to the body of existing literature. We analyze the company's social sustainability performance using primary data from 344 samples. Based on the resource-based perspective paradigm, we discovered a positive correlation between digital technology readiness and the moderating effect of ICT on AI-CRM capabilities. Big data analytics capacity significantly influences the adoption of AI-CRM and digital technology-prepared analytics. Competitive advantage and social sustainability performance are significantly and favorably correlated. One of the study's main conclusions is that competitive advantage and digital technology preparedness are mediated by AI-CRM adoption. Furthermore, the relationship between AI-CRM adoption and social sustainability performance is mediated by competitive advantage.

Index Terms— Digital technology readiness, Artificial Intelligence-Based Customer Relationship Adoption (AI-CRMA), Competitive advantage, Big Data Analytics Capability (BDAC), Information and Communication Technology Capability (ICTC), Social sustainability performance

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Introduction

Success in the era of the fourth industrial revolution depends on data, which are often enormous data sets that are primarily collected in an unstructured manner (Bai et al., 2020). Since the fourth industrial revolution (I4.0) was introduced ten years ago, businesses have achieved significant strides (Huang et al., 2023). Information sharing and supply chain visibility are enhanced by I4.0 technologies (Hamzah et al., 2021). With integrated big data analytics and artificial intelligence (AI) capabilities, advanced ICT capabilities have elevated organizations to new heights (Al-Gasawneh et al., 2022; Alqudah et al., 2021; Bai et al., 2020). The fast-changing business landscape of today is undergoing significant changes due to the use of emerging technologies like artificial intelligence and big data (Jaruwanakul, 2024). Big data analytics and AI-CRM adoption have become essential tactics for businesses looking to gain a competitive edge (Sohail Khan & Siddiqui, 2023). Concerns about the significant impacts on organizational dynamics surface as companies negotiate the challenges

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of incorporating this cutting-edge technology into their operations (Ozay et al., 2024). By investigating their effects on integration capability, team collaboration, and firm performance, this study aims to clarify the complex ramifications of AI-CRM adoption and big data analytical capabilities.

In order for different companies to be viable in their respective industries throughout the fourth industrial revolution, Chatterjee et al. (2023) investigation shows that artificial intelligence-supported customer relationship management (AI-CRM) systems can be crucial. Cooperation and teamwork can help accomplish the combination of diverse resources and company competencies needed for AI-CRM implementation (Chatterjee et al., 2019). Saura et al. (2021) assert that businesses will not be able to endure in the long run if they do not adjust to technological advancements. As a result, industrial companies need to assess their technological readiness for the technologies of the fourth industrial revolution (Chatterjee, Chaudhuri et al., 2021). Information and communication technology (ICT) capability must be further developed in order to achieve technology readiness (Sheshadri et al., 2021).

Additionally, consumer tastes and preferences change quickly in this dynamic world, which poses significant challenges for businesses. According to (Chatterjee, Chaudhuri, et al., 2021), shifting consumer behavior results in rapidly out-of-date goods and services, necessitating modifications to operational procedures and the introduction of innovative goods and services to meet consumer demands. Therefore, in order to create AI-CRMA expertise and respond to this evolving business environment, enterprises must acquire technological capability. In the meantime, client data generated from the official and informal relationships between network partners, such as service providers and clients, is integrated and examined via customer relationship management, or CRM (Chatterjee et al., 2019; Chatterjee et al., 2023; Chatterjee, Rana, et al., 2021; Chaudhuri et al., 2023). Due to the successful outcomes of implementing the traditional CRM approach in this context (Hamzah et al., 2021; Saura et al., 2021), firms' AI-driven CRM adoption is a crucial component of competitiveness that allows firms to understand their customers' changing preferences and optimize their relationship performance (Jaruwanakul, 2024; Sheshadri et al., 2021).

In fact, sustainable social performance is the end result of competitive advantage (Shah & Khan, 2020). Once stakeholders comprehend how a company releases its production processes, produces safe and eco-friendly products, uses resources, and takes sustainable actions for the benefit of society, they will be able to recognize its sustainable social performance (Chatterjee, Rana, et al., 2021; Ferreira et al., 2020). The introduction of AI and big data analytics is causing a paradigm shift in competitive advantage, which is a fundamental component of strategic management (Chen & Chen, 2022). Although earlier research recognizes the importance of technology in acquiring a competitive edge (Wang & Wang, 2020; Zhang et al., 2020), a more thorough analysis is necessary to determine the precise effects of AI-CRM and big data analytics on competitive advantage and subsequent company success. Recent research highlights the effects of big data analytics and AI-CRM on enterprises. The bibliometric analysis's findings made it easier to identify three main subfields within the AI literature related to CRM: the strategic management of AI-CRM connections, the implementation of AI and Big Data analytics capabilities with AI-CRM adoption (Chatterjee et al., 2019; Chaudhuri et al., 2023; Ozay et al., 2024).

The impact of technology readiness on ICT capability and AI-CRM adoption to comprehend that attaining social sustainability performance is not well-supported by empirical data (Binsaeed et al., 2023; Ferreira et al., 2020; Rahman et al., 2023). This study is unique in that it integrates these dimensions into the framework of the existing social sustainable performance literature. As a result, there is a dearth of research in the context of firms' capability in terms of technology readiness, ICT, and AI-CRM on relationship performance to achieve socially sustainable performance (Chaudhuri et al., 2023; Chen & Chen, 2022). For businesses to effectively engage customers in this fourth industrial revolution era, it is crucial that they build AI-CRM skills. The ability of the AI-CRM program to efficiently create CRM strategies for various market sectors is its most intriguing feature (Chatterjee et al., 2022; Huang et al., 2023).

Despite making major contributions to the AI-CRM literature, the research by (Chatterjee et al., 2022 Chatterjee et al., 2019 Chatterjee et al., 2023; Chatterjee, Rana et al., 2021; Chaudhuri et al., 2023) do not address social sustainability performance. Every company is attempting to adjust to technical advancements in this digital age and improve its CRM capabilities by investing in cutting-edge ICT solutions for increased market visibility (Chen & Chen, 2022). AI-CRM systems produce data that helps consumers assess the social sustainability of buying firms. Developing social sustainability initiatives that improve the social sustainability of organizations can be greatly aided by this knowledge (Rahman et al., 2023). However, more research is needed in this area, which is understudied.

AI-CRM systems are becoming more and more important. Even though the literature has identified the precursors of AI-CRM, there aren't many theory-driven, large-scale, quantitative, and empirical studies that examine the capacities needed to develop AI-CRM capability. To close this gap, we hope to provide answers to the following questions:

RQ1: Does digital technology readiness have a direct relationship with AI-CRM adoption?

RQ2: Does big data analytics capability have a moderating effect on digital technology readiness and AI-CRM adoption?

RQ3: Does ICT capability have a moderating effect on digital technology readiness and AI-CRM adoption?

RQ4: Does AI-CRM adoption have a direct impact on competitive advantage?

RQ5: Does AI-CRM adoption have a mediating impact between digital technology readiness and competitive advantage?

RQ6: Does competitive advantage have a direct impact on social sustainability performance?

RQ7: Does competitive advantage have a mediating impact between AI-CRM adoption and social sustainability performance?

The current study is significant since it looks at a crucial component of marketing management, namely CRM. Industrial buying and selling is a part of businesses. In order to establish technology readiness and build AICRM competence, which might ultimately improve competitive advantage and social sustainability performance, it is critical that every company comprehends the needs of its industrial clients and recognizes any ambiguity. The current study supports social sustainability and customer relationship management by empirically analyzing primary data gathered from 344 managers of various South African businesses. Through competitive advantage driving socially sustainable performance, the study finds the key mediating mechanisms that maximize AI-CRM and competitive advantage. Section 2 presents the hypotheses, which are derived from the AI-CRM capability approach. Data from South African industrial companies is used in this study. Section 3 presents the approach, while Section 4 uses covariance-based structural equation modeling to test the suggested hypotheses. Section 5 contains the discussion. Section 6 presents limitations and future research.

In the last section, conclusions are derived from the empirical investigation.

Theoretical underpinnings

Resource-View

In order to understand how organizations achieve a sustained competitive advantage, the resource-based perspective hypothesis examines and interprets the resources that they possess. The idea that every organization has unique qualities that can serve as sources of better performance and competitive advantage is at the heart of the RBV theory, according to Barney (Kruesi & Bazelmans, 2023). In this sense, resources that are difficult to buy or transfer, that require a significant change in the ICT capability, or that require a thorough AI-CRM capability are likely to be more specialized or unique to a given organization. Replicating such resources would be considered difficult. According to Mehmood et al. (2023), enterprises' ownership of distinctive inputs and competencies determines the performance variance among them. According to the RBV theory, an organization can be thought of as a collection of resources, including human, organizational, and physical resources (Samadhiya & Agrawal, 2024). Furthermore, Verma and Chaurasia (2019) claimed that the main source of long-term competitive advantage in achieving better performance is an organization's resources that are considered to be unique, valuable, difficult to duplicate, and difficult to replace. Interestingly, the use of RBV theory enables managers to comprehend why competencies are considered a company's most valuable asset. Managers are also able to recognize the importance of those assets in enhancing company performance. According to RBV theory, a company's performance is largely dependent on its competencies, big data analytics, and characteristics related to prior experiences (Huang et al., 2023). RBV theory, on the other hand, describes the capacity resources in relation to gaining a competitive edge.

According to the resource-based view (RBV), a company has a sustained competitive advantage if it can manage resources and skills that are valuable, unique, difficult to replicate, and non-substitutable. In order to explain skill building in this dynamic corporate context, management research frequently uses the well-liked RBV theory (Kruesi & Bazelmans, 2023; Mehmood et al., 2023; Samadhiya & Agrawal, 2024). The concept of ICT capabilities, which was developed from the literature of the school of strategic management, examines the competitive advantage of businesses operating in fast-evolving technological settings (Blut & Wang, 2020). Businesses use cutting-edge technology to connect with their customers and build relationships in order to achieve sustainable performance. They do this by continuously developing, modifying, and reconfiguring both internal and external competencies (Jafari-Sadeghi et al., 2021; Mehmood et al., 2023). Businesses may easily adjust to changing business environments by developing sensing, seizing, and reconfiguring capabilities with the use of ICT and AI-CRM capabilities (Rahman et al., 2023). As a result, businesses invest in and use resources to adapt to changes in the market throughout time (Sohail Khan & Siddiqui, 2023). According to Chaudhuri et al. (2023) and Foltean et al. (2019), capabilities are also dynamic since they can help businesses adopt competitive strategies by taking into account the fact that market conditions are changing and merging and converting existing resources in a unique and different way.

Model building

According to earlier research, businesses must invest heavily in information and communication technology to support AI-CRM adoption in order to develop marketing capabilities through the use of CRM tools to enhance competitive advantage (Wang & Kim, 2017). Building on this reasoning, we contend that ICT capability and big data analytics capability act as moderators and that enterprises' technological preparedness will aid in the development of AI-CRM capability. In this sense, ICT and technological preparedness are lower-order skills that contribute to the creation of a higher-order skill, namely AI-CRM capacity. We have employed industry dynamism as a contextual component and operationalized it as a mediator variable between technology readiness and competitive advantage as AI-CRM adoption. Second, AI-CRM assists different companies in identifying market opportunities and threats, seizing new market prospects, and addressing customers with newer products and services. Lastly, it assists them in reorganizing their business to accommodate technological advancements (Chaudhuri et al., 2023; Rahman et al., 2023). AI-CRM improves social sustainability performance and competitive advantage (Chatterjee et al., 2019; Chaudhuri et al., 2023). Fig. 1 presents the theoretical model. Since AI-CRM is based on altering routines,

such as demonstrating innovation in technology readiness and striving to improve ICT capability, it is conceptualized as an ICT and big data analytics capability, which is why the theoretical model is based on RBV theory. Success in these ever-changing business environments will rely on how fast and efficiently a company can realign its special resources and competencies to seize opportunities and satisfy consumer needs.

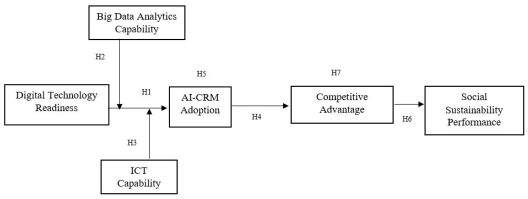

Fig. 1 *Theoretical framework*

Hypothesis Development

Digital technology readiness and AI-CRM adoption

CRM is examined in this study from a strategic perspective. Developing systems that enhance the customer experience is more crucial for strengthening partnerships than investing in traditional brand-related activities and advertising (Chatterjee, Chaudhuri et al., 2021). CRM initiatives are intended to help both businesses and customers (Ozay et al., 2024). Consequently, this increases shareholder value by making it possible to establish strategically relevant connections with important clients. To adopt new Industry 4.0 technologies, businesses must be technologically prepared (Bai et al., 2020). According to Chatterjee et al. (2023), two essential components for enabling digital CRM activities within the company are data and artificial intelligence. Dynamics 365 for customer insights is one example of a smart system of this type. Customer data sets can be subjected to predictive analytics via this technology. Chatterjee, Rana, et al. (2021); Sheshadri et al. (2021) providing AI-CRM technologies. When using AI-CRM solutions, businesses encounter infrastructure-related obstacles, which can be overcome with a preparation plan and efficient training, according to (Chatterjee et al., 2022). AI-CRM is seen as a game-changing technology that has the potential to greatly influence an organization's capacity for integration. The ability of an organization to use and integrate various technical components in a seamless manner is referred to as integration capability (Jaruwanakul, 2024). According to Chatterjee et al. (2019), AI-CRM systems are essential for improving integration across different organizational domains because of their capacity to centralize customer data and automate procedures. AI-CRM tools help cross-functional teams collaborate more effectively by facilitating real-time data sharing, improving communication, and offering insightful information (Alqudah et al., 2021). Teams may quickly access pertinent information when AI-driven analytics are integrated into CRM systems, creating a collaborative environment that is sensitive to market trends and client needs (Jaruwanakul, 2024; Saura et al., 2021). Thus, it is evident from the literature reviewed above that proper training and preparedness play a significant role in AI-CRM. Accordingly, we contend that developing an organization's technological preparedness is crucial to enhancing its adoption of AI-CRM. Consequently, we speculate:

H1: Digital technology readiness has a direct relationship with AI-CRM adoption.

Moderating effect of big data analytics capability

Since big data analysis capability is a recently proposed notion, its definition has not yet been agreed upon by prior research (Mikalef et al., 2019; Wang & Wang, 2020). Some academics have characterized big data analysis capability from a strategic standpoint as the capacity to use big data to inform choices about the operational strategy of the company. However, some others thought that big data analytic capabilities, in a broad sense, referred to an organization's capacity to leverage staff, infrastructure (technology), and data management to generate new insights and turn business into competitive advantages. Su et al. (2022) described big data analysis capability as a company's capacity to efficiently coordinate and deploy its data, technology, and personnel in order to collect and analyze data for fresh insights. The ability of an organization to efficiently gather, process, analyze, and extract useful insights from sizable and varied datasets is known as "big data analytical capability" (Gunasekaran et al., 2017). Leveraging the potential value contained in enormous amounts of data requires this competence. Jaruwanakul (2024) found a favourable correlation between an organization's ability to integrate and analyse big data. A more comprehensive understanding of organizational operations and improved decision-making processes are made possible by big data analytics, which offers the instruments and approaches to combine various data sources and types (Chen & Chen, 2022). By giving the team useful insights and evidence-based information for decision-making, big data analytics promotes teamwork (Binsaeed et al., 2023). According to studies, companies with sophisticated Big Data capabilities foster a data-driven culture that promotes teamwork, dismantles organizational silos, and fosters knowledge exchange (Verma & Chaurasia, 2019; Zhang et al., 2020). Researchers have discovered that big

data analytics has benefits and that new technology is highly dependent on compatibility (Sohail Khan & Siddiqui, 2023). Organisational leaders must think about and execute a contemporary big data analytics solution, assess the solution's compatibility with existing systems, and assess the change's advantages (Ferreira et al., 2020). The strategic significance of Big Data analytics in obtaining a competitive edge is continuously emphasized in the literature (Fathi et al., 2021; Sheshadri et al., 2021). Businesses that successfully use big data can spot consumer preferences, market trends, and operational efficiency, giving them an advantage over rivals (Akter et al., 2020; Gani et al., 2021). The following hypotheses are suggested based on the aforementioned assumptions:

H2: Big data analytics capability has a moderating effect on digital technology readiness and AI-CRM adoption.

Moderating effect of ICT capability

Since ICT aptitude equips businesses to adapt to shifting business environments and obtain a competitive edge, Chaudhuri et al. (2023) proposed that greater emphasis be placed on developing ICT capability. Developing the ability to design and utilize new applications is a component of ICT capability. To build ICT infrastructure to support their new apps, the company and its partner firms must have a thorough understanding of the business, product, and services associated with the firm (Chatterjee et al., 2022). In terms of increasing productivity, regular training and ongoing instruction on digital technologies yield the intended outcomes. For the successful implementation of new technologies like AI-CRM, companies must spend on sophisticated ICT training and the development of the technological infrastructure (Ferreira et al., 2020; Huang et al., 2023). Therefore, in order to improve skills, decision-makers must carefully monitor resources, learn about natural factors, and reorganize and modify their assets in the proper way. To gain a competitive edge, ICT competency necessitates integration with many (tangible and intangible) resources (Jaruwanakul, 2024). Furthermore, a crucial aspect of businesses is learning, which encompasses data-driven decision-making to develop new competencies as well as information gathering, security, and diffusion. In order to fully benefit from tumultuous times, businesses should also reorganize and further change their resources (Chen & Chen, 2022). IT infrastructure is, therefore, necessary for efficient operations and services. Furthermore, developing AI-CRM capabilities requires the establishment of an efficient and adaptable IT planning process in collaboration with industry partners. Furthermore, companies must foster an environment that encourages their business partners to experiment with new and improved ICT usage methods (Binsaeed et al., 2023; Rahman et al., 2023). Technology readiness, according to Chaudhuri et al. (2023), is people's willingness to adjust and use new technologies in new ways. The underlying mechanism consists of a few enablers and inhibitors that influence how people decide to employ the newest technology. Accordingly, a favorable opinion of the technology promotes comfort, whereas a bad opinion causes unease and a reluctance to utilize it (Ferreira et al., 2020). Technology readiness is significantly influenced by innovative thinking and optimism (Chatterjee et al., 2019). According to Jafari-Sadeghi et al. (2021), the propensity to use new technology is positively correlated with technological readiness. According to Binsaeed et al. (2023), AI-CRM systems are highly successful in managing the network's customer relationships. Primarily, AI-CRM improves employee and user perceptions; second, it stimulates creativity; third, it provides comfort while utilizing this kind of system for improved information administration; and fourth, it provides improved security, hence facilitating overall technological readiness. The development of ICT capability, which in turn leads to the development of AI-CRM capability, is a consequence of technology readiness, which is crucial for adjusting to technological changes in the fourth industrial revolution (Blut & Wang, 2020; Rahman et al., 2023; Sohail Khan & Siddiqui, 2023). Consequently, we speculate:

H3: ICT capability has a moderating effect on digital technology readiness and AI-CRM adoption.

AI-CRM adoption and competitive advantage

According to Shah and Khan (2020), a company's competitive edge is its distinct set of skills and attributes that allow it to outperform its competitors and establish a stronger position in the market. It is a key idea in strategic management that highlights how crucial efficiency and distinction are to obtaining a competitive advantage (Ferreira et al., 2020). Fathi et al. (2021) assert that Porter's methods, which include cost leadership and differentiation, are widely accepted as general competitive strategies and are regularly used as standards for evaluating a company's competitive advantage. As evidenced by the notable improvements recorded by numerous entities, these methods are recognized for having a large positive impact on the performance of various organizational kinds (Chatterjee, Rana et al., 2021). According to Sheshadri et al. (2021), employees' opinions and propensity to use AI-enabled CRM solutions are significantly influenced by CRM quality and satisfaction. Chatterjee, Rana, et al. (2021) assert that the resource-based view holds that businesses have a stronger competitive edge and more sustainable performance when they have resources that are valued, difficult to replicate, and not readily available. The RBV paradigm is further extended by Gani et al. (2021) to explain inter-firm connections. When partner companies put in the time, money, and expertise to develop supply chain capabilities, better results are obtained (Akter et al., 2020). According to Sohail Khan and Siddiqui (2023), big data analytical intelligence improves CRM efficiency and has a positive correlation with mass customization capacity. We contend that AI-CRM capability is a source of inter-firm competitive advantage in accordance with the RBV paradigm since it will offer useful data for important business decisions. However, little is known about the relationship between AI-CRM competence

and companies. Researchers have recently turned their attention to competitive advantage, as businesses that successfully apply these tactics show increased profitability (Verma & Chaurasia, 2019; Zhang et al., 2020). Interestingly, competitive advantage has a strong correlation with a number of market performance indicators in addition to having a significant impact on a company's financial performance (Binsaeed et al., 2023). Competitive advantage has emerged as the primary element having a significant and elevated impact on company performance, claims Jaruwanakul (2024), we speculate:

H4: AI-CRM adoption has a direct impact on competitive advantage.

Mediating Effect of AI-CRM Adoption

Relationship start, maintenance, and termination are the three key features of AI-CRM operations at the customer-facing level (Chatterjee et al., 2019). The main goals of the relationship's beginning stage were to implement the required customer analysis to support the two activities listed above, attract new customers (customer acquisition activities), and retain existing clients (customer recapture activities). Customers are re-engaged, cross-sold, and up-sold, and referrals are managed during a relationship's maintenance phase. Each of these duties is supported by specific customer analysis, often known as maintenance analysis (Alqudah et al., 2021). Customer exit management and the analysis required for its implementation are both incorporated into the termination procedure. In the context of businesses, AI-CRM is therefore thought to be a suitable approach. The term "AI-CRM" refers to both a business strategy and the software that businesses purchase to manage client interactions (Chatterjee et al., 2023). Ozay et al. (2024) assert that hotels can better meet the wants and preferences of each individual consumer and build interactive relationships with them by utilizing AI-CRM in their marketing. AI-CRM is currently a crucial tool in the hotel sector, and according to Chatterjee et al. (2022), it is thought to be the second most effective management tool after strategic planning. As a result, AI-CRM systems can be helpful in identifying key clients as well as forecasting and investing in long-term partnerships. Artificial intelligence-powered CRM systems allow companies to use consumer data, forecast behavior, and customize interactions to increase customer pleasure and loyalty (Chatterjee, Rana et al., 2021). By using such solutions, a company can close the gap between its technological readiness and competitive advantage. Organizations can improve operational efficiency, innovate service delivery, and better meet market demands by utilizing AI-CRM. As a result, integrating AI-CRM turns digital readiness into a real advantage, putting businesses in a position to beat rivals and maintain their market relevance over the long run (Jaruwanakul, 2024; Saura et al., 2021; Sheshadri et al., 2021). As a result, the business partners (supply and buyer firms) will want to stay connected and communicate frequently in order to investigate possible business prospects, which will improve competitive advantage, we speculate:

H5: AI-CRM adoption has a mediating impact between digital technology readiness and competitive advantage.

Competitive advantage and social sustainability performance

In this digital age, social sustainability is becoming more and more significant (Bai et al., 2020). According to Samadhiya and Agrawal (2024), social sustainability issues arise when businesses fail to treat their partners and employees fairly, permit subpar working conditions in factories, put up with a lack of workplace health and safety, and lack diversity, corporate social responsibility, and product responsibility policies. According to the literature, fostering relationships improves a sustainable society Rahman et al. (2023) or social sustainability performance (Bag & Rahman, 2023). Strong business ties between companies will lead to interest alignment and, hence, alignment of sustainable development goals. Nevertheless, there is a dearth of empirical research on the relationship between businesses' competitive advantage and social sustainability performance. Any business's ultimate goal is to build and sustain long-term customer relationships (Bai et al., 2020). As a result, the rising body of research on marketing emphasizes the significance of these relationships (Al-Gasawneh et al., 2022; Das & Hassan, 2022). Because they tend to boost consumer commitment and loyalty, businesses have realized that appealing corporate connections are a benefit when it comes to creating long-term customer relationships (Attia, 2023). Given the highly interacting character of services and the interdependence of the processes of production and consumption, this is especially pertinent to service organizations (Shah & Khan, 2020). Customers now expect businesses to maintain ethical standards and act in a socially responsible manner, which is further fueled by the modern business world's growing interconnectedness and ethical concerns (Alqudah et al., 2021; Hamzah et al., 2021). Customers now demand that businesses combine shareholder expectations with societal well-being, which has caused businesses to prioritize societal orientation more (Attia, 2023; Bag & Rahman, 2023; Chaudhuri et al., 2023). Therefore, we speculate:

H6: Competitive advantage has a direct impact on social sustainability performance.

Mediating effect of competitive advantage

Since Shah and Khan (2020) their groundbreaking studies, competitive advantage have emerged as a key field of study for knowledge and innovation. Despite its widespread use, there are still a number of drawbacks, most notably the literature's fragmentation (Fathi

et al., 2021). Several authors, Chatterjee, Rana, et al. (2021) and Sheshadri et al. (2021) contend that different discussions on competitive advantage arise that, while somewhat complementary, may not have a shared theoretical foundation. The variety of definitions and conceptualizations of competitive advantage demonstrates the field's fragmentation. These conceptualizations can be helpfully categorized into groups based on a certain desired objective, such as the attainment of competitive advantage or successful adaptability to environmental changes. The adoption of AI-CRM empowers businesses to gather and evaluate client information, predict needs, and provide tailored solutions, strengthening client relationships (Akter et al., 2020). An organization gains a major competitive advantage in the market as a result of this technological competence, which also improves operational and strategic efficiency (Gani et al., 2021). In turn, competitive advantage serves as a conduit via which the advantages of AI-CRM adoption are translated into more general social sustainability results. Organizations can efficiently manage resources, adopt sustainable practices, and participate in community-focused activities that are in line with social objectives by utilizing their market position. The resulting crisis has fundamentally altered consumer purchasing habits (Chatterjee, Chaudhuri, et al., 2021; Wang & Wang, 2020). Family firms had to adapt their business models to the new catastrophic environment by embracing, creating, and deploying new technologies (Chatterjee et al., 2019; Ozay et al., 2024). In this case, it is believed that success would have been achieved if the companies had promptly, accurately, and efficiently analyzed the vast amount of client data to satisfy the needs of the customers (Han et al., 2021). Accordingly, it is maintained that CRM operations need to be developed to a considerable degree, which can be accomplished by incorporating AI technology into business CRM systems (Alqudah et al., 2021; Chaudhuri et al., 2023; Shah & Khan, 2020). Therefore, we speculate:

H7: Competitive advantage mediates the impact of AI-CRM adoption on social sustainability performance.

Research Methods

Numerous South African businesses are expanding quickly (Oguji & Owusu, 2021). According to Oguji and Owusu (2021), the African area is making good success in a number of crucial business-related indices. Businesses in nations like South Africa have benefited greatly from the use of modern technology. According to Oguji and Owusu (2021), South African consumers are regarded as being above the middle class by the Organisation for Economic Cooperation and Development (OECD), and by 2025, they will collectively spend an extra $174 billion annually on housing, consumer goods, education, and transportation. Although many businesses have made significant changes to their business strategies as a result of South African consumer data, one of the biggest spenders in this region is this sector, which is expanding very quickly. For example, businesses in this African region spent nearly $2.6 trillion in 2015, with 40% going to South Africa and Nigeria. By 2025, business spending is predicted to reach $3.5 trillion, of which 50% will go towards materials, 16% to capital goods, and the remainder to the telecommunications, transportation, and finance services sector (Bai et al., 2020; Oguji & Owusu, 2021). South Africa is home to 50% of Africa's major corporations. As a result, this study was carried out across several South African provinces, where researchers gathered information from workers engaged in business activities in the manufacturing industry.

Sampling and data collection process

A survey questionnaire was utilized in this study to collect information from workers at various makers of industrial items. To improve the findings' generalizability, a range of industry participants were included in the sample framework. This study's data collection process was divided into many stages. The survey questionnaire was operationalized for its ultimate usage in the field in the following phase. After the first phase, the scientific method was used to choose the questionnaire items.

Data were collected from July to September of 2024. The researchers requested two senior academicians and two senior firm managers to share their opinions and recommend necessary changes to the assessment items pertaining to each construct chosen from the prior literature in the first section of this phase [Digital technology readiness, ICT capabilities, AI-CRM adoption, big data analytics capabilities, competitive advantage, social sustainability performance]. The researchers changed the instrument's phrasing in response to the experts' input. Additionally, in order to assess the validity and internal consistency of the measurement items, we carried out pilot research with 344 employees from various business market companies as part of the second stage of instrument validation. The findings show satisfactory Cronbach's Alpha (α) values, ranging from 0.926 to 0.849, for each of the study constructs. This demonstrates that every item in the suggested questionnaire is appropriate for assessing the latent constructs. As a result, the pilot study's findings raised no new issues for the researchers. In order to get information from different companies, the questionnaire was operationalized for the main survey (Appendix A1). Using a straightforward random sample method, the researchers selected 344 companies from South African companies. Potential responders were contacted online and given a thorough explanation of the study's goals when the researchers had identified them. To boost the response rate, the researchers used peer requests and follow-up emails, as recommended in the literature (So et al., 2019). Just 344 completed replies were obtained by the researchers at the end of September 2024, representing a 55.32 percent response rate from the targeted firms. Table 1 displays the demographic profile of the company employees who participated in this study.

Table I
Demographic particulars (*n* = 344)

Demographic details	Description	Numbers	Percentage
Gender	Male	212	61.62%
	Female	132	38.37%
Age (Years)	22-33	80	23.25%
	33-44	120	34.88%
	44-55	109	31.68%
	Above 55	35	10.17%
Education Level	Post-Graduate	196	56.97%
	Graduate	101	29.36%
	Diploma	47	13.66%
No. of Employees	Less than 200	61	17.73%
	200-500	104	30.23%
	500-1000	121	35.17%
	Above 1000	58	16.86%
Organization Age	Less 15	100	29.06%
	15-30	128	37.20%
	Above 30	116	33.72%
Designation	Lower level employees	142	41.27%
	Middle-level employees	122	35.46%
	Upper-level employees	80	23.25%

Procedure and measurements

A Google form-based survey with 40 items was created and dispersed according to each pertinent concept. ICT competency (ICT) (5 items) is derived from studies by Rahman et al. (2023), while digital technology readiness (DTR) (6 items) is derived from Rahman et al. (2023). Six items taken from Jaruwanakul (2024) were utilized in the study to gauge big data analytics capabilities (BDAC). Chatterjee, Rana, et al. (2021) were the sources of the seven factors that made up Competitive Advantage in Firms (CA). Using nine questions modified from Jaruwanakul (2024), the artificial intelligence-based customer relationship management adoption (AI-CRMA) construct was assessed (2021d). Lastly, the seven items that made up social sustainability performance (SSP) were modified from Rahman et al. (2023) research. Every question in the study used a 5-point Likert scale, with 5 denoting "strongly agree" and 1 denoting "strongly disagree."

This scale was chosen because, in order to successfully analyze the data using structural equation modeling (SEM), it is crucial to take into account the number of points to be operationalized, ensuring that the same number of points are applied to all measurement items (Hair et al., 2024). According to the earlier study, employing a seven-point instead of a five-point (or less) scale improves respondent stimuli, reduces measurement errors, and produces more accurate responses that are simpler for the researchers to use with a good reproduction of a respondent's actual assessment of the study variables.

Data analysis method

Using SmartPLS 3.0, the study ran descriptive statistics to assess for normality and find pertinent outliers and missing data. In order to comprehend the frequency, percentage, and pertinent average values of the respondents' demographic data, descriptive statistics were also conducted. The homological validity and suggested relationship were then investigated. The study then used structural equation modeling (SEM) to test whether the information and communication technology capability (ICT), artificial intelligence-based customer relationship management adoption (AICRMA), competitive advantage (CA), and digital technology readiness (DTR) of firms could predict social sustainability performance (SSP) (Hair et al., 2024).

The researchers tested the moderating role of information and communication technology capability (ICT) in the relationship between artificial intelligence-based customer relationship management adoption (AICRMA) and digital technology readiness (DRT) using SmartPLS, which was recommended by Hayes (2013). The researchers tested the mediating role of artificial intelligence-based customer relationship management adoption (AICRMA) in the relationship between digital technology readiness (DRT) and competitive advantage (CA) using SmartPLS, which was recommended by Hair et al. (2024). Also, it mediates the role of competitive advantage among artificial intelligence-based customer relationship management adoption (AICRMA) and social sustainability performance (SSP). Lastly, using SmartPLS, it was determined whether this indirect path (i.e., DRT → AICRMA→ CA) and (i.e., AICRMA → CA→ SSP) as proposed by Hair et al. (2024).

Data Analysis

Measurement model validation

Table II
Assessment of measurement model

CN	Mean	SD	L	α	CR	AVE	AICRMA	BDAC	CA	DTR	ICTC	SSP
AICRMA	3.19	1.003		0.926	0.938	0.629	0.793					
AICRMA1			0.813									
AICRMA2			0.793									
AICRMA3			0.743									
AICRMA4			0.782									
AICRMA5			0.787									
AICRMA6			0.810									
AICRMA7			0.831									
AICRMA8			0.717									
AICRMA9			0.855									
BDAC	4.87	1.108		0.863	0.898	0.596	0.621	0.772				
BDAC1			0.721									
BDAC2			0.801									
BDAC3			0.779									
BDAC4			0.821									
BDAC5			0.785									
BDAC6			0.717									
CA	4.18	1.018	0.797	0.879	0.907	0.583	0.707	0.689	0.764			
CA1			0.847									
CA2			0.838									
CA3			0.765									
CA4			0.709									
CA5			0.746									
CA6			0.622									
CA7												
DTR	4.45	1.116		0.849	0.889	0.578	0.656	0.682	0.740	0.760		
DTR1			0.738									
DTR2			0.827									
DTR3			0.872									
DTR4			0.765									
DTR5			0.800									
DTR6			0.702									
ICTC	4.69	1.054		0.892	0.920	0.698	0.709	0.668	0.704	0.679	0.835	
ICTC1			0.799									
ICTC2			0.887									
ICTC3			0.893									
ICTC4			0.785									
ICTC5			0.805									
SSP	4.59	1.079		0.874	0.903	0.571	0.711	0.704	0.717	0.745	0.734	0.756
SSP1			0.780									
SSP2			0.819									
SSP3			0.798									
SSP4			0.727									
SSP5			0.679									
SSP6			0.737									
SSP7			0.742									

"CN=Construct's Name, SD=Standard Deviation, L=Loadings, α=Cronbach's Alpha, CR=Composite Reliability, AVE=Average Variance Extracted, Digital technology readiness (DTR), information and communication technology capability (ICTC), Competitive Advantage (CA), Big data analytics capability (BDAC), artificial intelligence-based customer relationship management adoption (AICRMA), social sustainability performance (SSP)".

Convergence validity and discriminant validity were evaluated as part of the data examination process for Confirmatory Factor Analysis (CFA). Cronbach's Alpha was used to measure internal consistency, and Table 2 shows that the value had to be 0.70 or greater (Hair et al.,

2024). Criteria including t-values greater than 1.98, p-values less than 0.5, and factor loadings greater than 0.5 were used to determine acceptability. Furthermore, in accordance with the recommendations made by Fornell and Larcker (1981), the Average Variance Extracted (AVE) overcomes the cutoff point of 0.4, and the Composite Reliability (CR) surpasses the barrier of 0.6. These standards guaranteed the estimates' robustness and validated the measurement model's discriminant and convergence validity.

In accordance with Fornell and Larcker's (1981) recommendations, calculating the square root of the Average Variance Extracted (AVE) for every variable is necessary to evaluate discriminant validity. When these computed values exceed all inter-construct or factor correlations, discriminant validity is validated in the particular context of this investigation. This result demonstrates the uniqueness of the constructs under consideration by showing that each construct has better correlations with its own measurements than with measures of other constructs. Additionally, the analysis looks at correlation coefficients to address possible multi-collinearity issues. The findings, which are shown in Table 2, show that multi-collinearity is not a serious problem. This conclusion is based on factor correlations that fall below the widely accepted cutoff point of 0.80. The study's measurement model is more reliable and resilient because there aren't any significant correlations between the variables, indicating that they are largely independent.

Structural model analysis

The suggested conceptual model of the study was tested using structural equation modeling (SEM) (see Fig. 1). The study evaluates the structural model's examining the structural link between the variables. SmartPLS 3.0 Hair et al. (2024) was used to operationalize the results of standardized estimates for the path analysis using the maximum likelihood discrepancy estimation approach (see Fig. 2 & Table 4). At $p < 0.001$, each of the individual factor loading routes was significant. This indicates that all of the items that help to explain the factors that were assigned to them were supported by the results (i.e., the digital technology readiness, ICT capability, competitive advantage, big data analytics capability, AI-CRM adoption, and social sustainability performance).

Figure 2 illustrates the satisfactory degree of explanatory power attained by the complete structural model. According to Hair et al. (2024), a good effect is indicated by an R^2 value greater than 0.26 or 26%. In this instance, the pathways investigated if digital technology readiness and AI-CRM adoption were negatively and significantly correlated ($R^2 = 0.666$, $\beta = -0.173$). Additionally, the paths investigated whether there was a significant and negative link between AI-CRM adoption and competitive advantage ($R^2 = 0.500$, $\beta = -0.707$). Furthermore, the paths investigated whether there was a significant and positive link between competitive advantage and social sustainability performance ($R^2 = 0.841$, $\beta = 0.917$).

The standardized regression weights computed in the SEM model are shown in Table 3, and the standardized results are shown in Fig. 2. All of the straightforward hypotheses (H1, H4, and H6) are supported by the data.

Table III
Direct Analysis

Hypothesis	Path	Estimate	P
H1	DRT → AICRMA	-0.173	***
H4	AICRMA → CA	-0.707	***
H6	CA→ SSP	0.917	***

Note: "***=0.01 or less". Note: "Digital technology readiness (DTR), Competitive Advantage (CA), artificial intelligence-based customer relationship management adoption (AICRMA), social sustainability performance (SSP)".

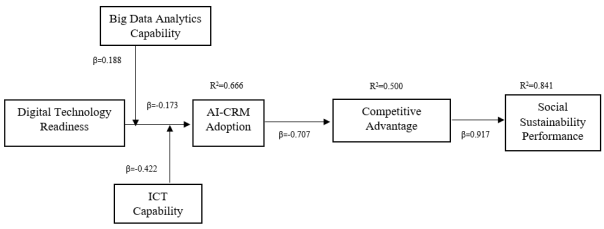

Fig. 2 *Structural model*

Test of mediation

In order to investigate the direct and mediation effect of AI-CRMA between DTR and CA, a computational tool that streamlines the test of mediation of observed variables with a regression path analysis tool using ordinary least squares, the study used a structural model in SmartPLS, as suggested by Hair et al. (2024). The findings of the study examining the relationship among DTR, CA, and AI-CRMA indicate that the adoption of AICRMA is likely to have an impact on competitive advantage and digital technology readiness (DTR). Also, the mediating effect of competitive advantage between AI-CRM adoption and social sustainability performance (see Table 4). Therefore, H5 and H7 are supported.

Table IV
Test of mediation

Hypothesis	Path	Estimate	t (SE)	P
H5	DTR → AICRMA→CA	0.122	3.613	0.00
H7	AICRMA→CA→ SSP	-0.649	14.670	0.00

Note: "Digital technology readiness (DTR), Competitive Advantage (CA), artificial intelligence-based customer relationship management adoption (AICRMA), social sustainability performance (SSP)".

Test of moderation

The study employed a structural model in SmartPLS, as recommended by Hair et al. (2024), to examine the direct and moderating effects of ICT capacity between DTR and AI-CRM adoption. This computational tool simplifies the evaluation of moderation. The results of the study looked at how ICT competence influenced digital technology readiness and the adoption of AI-CRM. Additionally, table 5 shows how big data analytics proficiency moderates the relationship between digital technology readiness and AI-CRM adoption.

Table V
Test of moderation

Hypothesis	Path	Estimate	t (SE)	P
H2	DTR*ICTC →AICRMA	0.188	2.703	0.00
H3	DTR*BDAC →AICRMA	-0.422	2.991	0.00

Note: "Digital technology readiness (DTR), Competitive Advantage (CA), artificial intelligence-based customer relationship management adoption (AICRMA), information and communication technology capability (ICTC), big data analytics capability (BDAC)".

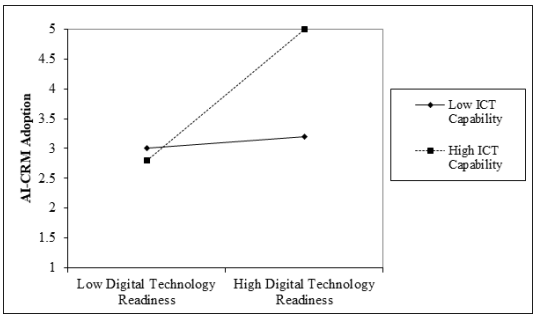

Fig. 3 *ICT capability as a moderator*

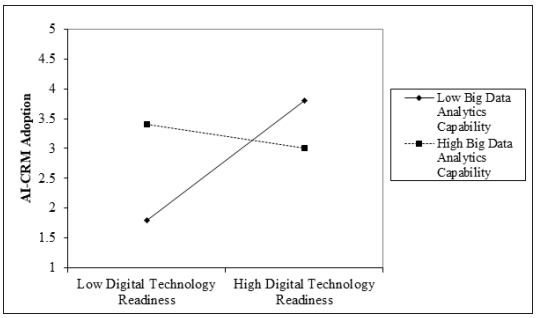

Fig. 4 *Big data analytics capability as moderator*

Discussion

By creating a theoretical framework, this study experimentally explores the ideas of social sustainability, AI-based CRM adoption for competitive advantage, and digital technology readiness. By creating a theoretical framework to comprehend digital technology readiness and AI-CRM adoption for improving social sustainability performance, the current study has already addressed RQ1 through RQ7, drawing inspiration from the resource-based view philosophy. Direct effects, mediating effects, and conditional moderating effects are developed to test the hypotheses. Therefore, the main theoretical contribution of this study is the theoretical and empirical explanation of the causal and mediating relationship between the firm's adoption of AI-CRM and its readiness for digital technology based on the conditional moderating effects of big data analytics and ICT capabilities.

All seven of the hypotheses developed for this study were supported by the data analysis results. The findings show a strong positive correlation between digital technology readiness and AI-CRM adoption and their level of technological preparedness. Thus, the study validates the results of the earlier research in the context of different companies that indicated a significant influence between technology readiness and AI-CRM adoption (Chatterjee, Rana et al., 2021; Das & Hassan, 2022; Saura et al., 2021). It also supports the first hypothesis.

AI-CRM competence is positively correlated with digital technology preparedness under the moderating influence of ICT capability. The results are supported by empirical research, which also highlights the existence of ICT capacity, a crucial factor to take into account when examining the connection between digital technology readiness and AI-CRM adoption (Jaruwanakul, 2024; Sheshadri et al., 2021). The findings also underscored the necessity of incorporating big data analytics proficiency as a moderating variable in the association between digital technology readiness and AI-based CRM adoption. This is corroborated by earlier research, including that conducted by Chatterjee, Rana, et al. (2021) and Chaudhuri et al. (2023). It also supports the second and third hypotheses.

A number of academics have already addressed the significance of technology, big data analytics, ICT capability, and AI-CRM adoption in improving competitive advantage for social sustainability in the field of digital technology readiness and AI-based CRM adoption. The current study makes a significant contribution to the empirical findings (Alqudah et al., 2021; Ferreira et al., 2020; Su et al., 2022). It also supports the fourth and sixth hypotheses.

The findings of the empirical evidence demonstrate a strong correlation between socially sustainable performance and competitive advantage, suggesting that new trends in the current business environment and inter-firm relationships are essential for attaining socially sustainable performance (Akter et al., 2020; Foltean et al., 2019). The fifth and seventh hypotheses are supported by empirical findings that also show a significant and positive mediating role for competitive advantage in the relationship between AI-CRM adoption and social sustainability performance, as well as the mediating relationship between digital technology readiness and competitive advantage. Additionally, it validates the results of the earlier study (Chatterjee, Chaudhuri, et al., 2021; Rahman et al., 2023; Shah & Khan, 2020).

However, by evaluating the role of ICT competence in the relationship between digital technology readiness and AI-based CRM, the existing research has also failed to thoroughly examine the importance and facilitators of technology-driven organizations that boost technology readiness. This study fills a vacuum in the literature by experimentally examining a model that combines a number of crucial lower-order characteristics to foster AI-CRM adoption and ultimately achieve social sustainability performance, especially with regard to AI-based CRM and competitive advantage.

This study provides a thorough explanation of the components and methods that assist businesses in comprehending and appreciating the value of their resources by integrating them with ICT skills for better strategies that impact businesses' social sustainability performance. Above all, by emphasizing the lower-order capabilities (like ICT capability) that managers should concentrate on in order to achieve higher-order capabilities (like big data analytics capability), this study closes the gap between theory and practice. Since AI will dominate corporate processes in the future, it is crucial that businesses use data-driven decision-making for customer management Wang and Wang (2020) and implement AI-CRM technologies to enhance social sustainability performance and competitive advantage.

Consequently, the approach will undoubtedly enhance the company's reputation both domestically and internationally. Businesses that do not adjust to technology advancements will eventually become unsustainable and fail. This study makes it abundantly evident that businesses should prioritize three key areas in this challenging business climate: first, adopting AI-based CRM; second, investing in competitive advantage; and third, concentrating on social sustainability performance. By 2050, the world will have entered the fifth industrial revolution, in which artificial intelligence will be a fundamental component of all systems. Businesses need to prepare for the fourth industrial revolution today in order to transition to the fifth one gradually over time.

Theoretical contribution

The current study's findings make important additions to the body of literature. The ICT of businesses as a whole has been the only subject of previous research (Ferreira et al., 2020; Kruesi & Bazelmans, 2023). The social sustainability performance model has been reinforced by taking into account the ICT, big data analytics, and digital technology preparedness as exogenous antecedents to analyze the adoption of AI-based CRM to improve competitive advantage. The current study uses AI-based CRM systems to further our understanding of ICT. Additionally, this study offers empirical support for the effects of industry dynamism on AI-based CRM adoption. In this sense, the current study offers an empirical reference to help management and scholars comprehend the significance of AI-based CRM for achieving social sustainability. The empirical examination of the pathways (Fig. 2) is the study's distinctive contribution, and the model is tested using resource-based view theory. AI-based CRM enhances organizational performance, according to earlier research (Chaudhuri et al., 2023; Mehmood et al., 2023). However, by demonstrating that resource-based theory also enhances social sustainability performance, our study adds to the body of research on AI-based CRM. However, this study also provides a new theoretical contribution by empirically demonstrating how firms' ICT affects their AI-based CRM and elucidating the underlying conditional moderated processes of ICT and big data analytics capability in relation to digital technology readiness and AI-CRM adoption. By expanding social sustainability performance, the current study has demonstrated the moderating influence of ICT and big data analytics capabilities on the underlying mediating mechanism of AI-based CRM adoption and competitive advantage in a single holistic model. Above all, by attaining social sustainability performance, firms can use AI-based CRM to leverage their current IT resources to seize new collaboration advantages and stay competitive in their market environment (Rahman et al., 2023; Su et al., 2022).

Practical implications

The results of this study indicate that the adoption of AI-CRM is positively correlated with digital technology preparedness. The main lesson here for business managers is to be aware of technical readiness. Employees and channel members must invest time and energy in becoming technologically literate if AI-CRM development is to advance. Managers must integrate digital technologies into their everyday operations and marketing responsibilities. More focus needs to be placed on providing regular employee training on digital technologies that emphasize their benefits. The second finding indicates a moderating relationship between digital technology readiness and AI-CRM adoption and big data analytics capability, while the third finding indicates a positive moderating relationship between digital technology readiness and AI-CRM adoption and information and communication technology capability (ICT). Managers must recognize that ICT skills and technological preparedness are organizational capabilities. In reaction to a changing business scenario, managers need to remember that a firm can create a BDAC if it can mix, build, and reconfigure its digital technology readiness and AI-CRM adoption. The most important takeaway for managers here would be to keep abreast of the most recent developments in the ICT sector and to continue building ICT infrastructure in accordance with emerging trends. Finally, it is critical that suppliers and customers work together to embrace flexible IT planning solutions. Jaruwanakul (2024) asserts that the senior management is concerned about the clear investment in CRM. The results of this study give managers of businesses crucial insight into the fact that, while they might not immediately gain from the implementation of AI-based CRM, optimizing them would yield greater returns down the road. In order to foster AI-CRM adoption, managers must have a comprehensive understanding of how ICT capacity supports technology readiness. Therefore, managers should never undervalue the significance of ICT proficiency. To improve their ICT skills, managers must become more innovative and establish some new practices.

The results indicate a positive correlation between competitive advantage and AI-CRM capacity. It can assist marketers with all of the standard manual tasks, such as calendar management, meeting scheduling, phone conversations, record keeping, and follow-up. Managers must thus match AI-CRM objectives with company plans. Additionally, in order to implement AI-CRM, data access is required; thus, the development of a data-driven culture must be the primary priority. The adoption of AI-CRM, which are powerful data aggregation tools, can assist businesses in more efficiently collecting, storing, managing, and organizing interactions. Automated client contact and better management promote enduring customer connections. The adoption of AI-CRM increases competitive advantage. Thus, managers must learn how to properly classify key clients and partners using AI-based CRM in order to offer specialized services that meet their requirements. The following result demonstrates that social sustainability performance and competitive advantage are positively correlated. It is important for managers to recognize that relationship rent investments would benefit society. Businesses will get positive

results when they collaborate with supply chain partners to create sustainable marketing initiatives. Therefore, when making marketing decisions, managers must take the influence on local communities into account. In order to give workers a safe and healthy workplace, managers must also improve working conditions and adhere to labor rules. It is imperative for managers to keep positive relationships with stakeholders and refrain from acting abusively towards staff members or local communities.

Limitations and future research

When analyzing the results, it is important to take into account the constraints of the resource-based view. Since RBV is commonly portrayed in studies as an abstract capability, several scholars contend that managers' deliberate attempts to develop and enhance it may not be beneficial. Second, there is not a standardized method for assessing capabilities. We have further tested the notion using cross-sectional data, similar to previous investigations. Long-term and time-series data are required to measure the evolution of capabilities and their effect on competitive advantage and social sustainability performance. Future researchers can, therefore, plan their investigations appropriately. The authors contend that the current research initiatives in the context of businesses' social sustainability performance supplement a few fields of study, including the use of technology, data analytics, and relationship value proposed by (Wang & Wang, 2020; Zhang et al. 2020). Future studies may also concentrate on other topics like the customer journey and competitive advantages, marketing or financial issues, and their influence on revenue development by highlighting the social sustainability performance of businesses within a particular ICT capability and big data analytics capability. To identify the difficulties in implementing businesses' social sustainability performance, future research projects can also look at innovation capabilities, customer journey, and B2B relationship value, along with advanced technology and revenue growth. Above all, the current study used data gathered from a particular developing nation (South Africa) in a business-to-business setting to test the suggested theoretical framework. Future research can also use business-to-business contexts from other emerging countries, like Southeast Asia (Sohail Khan & Siddiqui, 2023), India (Chatterjee, Chaudhuri et al., 2021), and New Zealand (Alqudah et al., 2021), to address this limitation. Data can be analyzed independently or combined into a comparative regional study using the same theoretical framework that has been proposed for further generalization.

Conclusion

Since consumers and business partners are a company's lifeblood, every company views its marketing and sales department as being of utmost importance. Businesses are profiting from data-driven decision-making in this fourth industrial revolution, and AI-CRM has demonstrated enormous promise in enhancing customer management. The literature shows that AI-CRM can boost a company's performance, but there is a dearth of research on creating lower-order capabilities that can support the deployment of AI-CRM in businesses. Furthermore, little research has been done on its relationship to social sustainability. The current study offers intriguing findings derived from an examination of corporate data. The results show that the adoption of AI-CRM is strongly correlated with digital technology readiness in this fourth industrial revolution period, although ICT and big data analytics capabilities play a partially moderating influence. Then, the sample type is comparatively single; larger and more diverse sample data can be collected in future studies. Second, this study uses questionnaire surveys to collect data. Future research can aim to validate the statistical results by conducting objective surveys with employees in various positions within the organization at various times. In order for the methodology to be theoretically based, Structural Equation Modelling (SEM) should be employed to determine the precise relationship between the variables. Future studies ought to focus on this topic since it has more practical applications

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Appendix

Table VI
Questionnaire items

Constructs	Items	Questions	Adapted Source
Digital Technology Readiness	DTR1	B2BTR1 Digital technologies generate a perception of productivity improvement among industrial manufacturing firms	(Rahman et al., 2023)
	DTR2	Using digital technologies at work is giving better results compared to the use of manual techniques a few years back	
	DTR3	Digital technologies provide better flexibility at work	
	DTR4	Our firm has adopted advanced digital technologies beforehand than our competitors	
	DTR5	Our firm provides regular training on digital technologies to employees and demonstrates the benefits	
	DTR6	Our firm has invested a huge amount in building the technological infrastructure for the effective application of data-driven AI-CRM	
Big Data Analytics Capability	BDAC1	We have access to very large, unstructured, or fast-moving data for analysis.	(Jaruwanakul, 2024)
	BDAC2	We integrate external data with internal to facilitate analysis of business environment	
	BDAC3	Our BDA managers are able to understand the business need of other functional managers, suppliers, and customers to determine opportunities that big data might bring to our business	
	BDAC4	Our "big data analytics" staff is well trained	
	BDAC5	We are willing to override our own intuition when data (2019) contradict our viewpoints	
	BDAC6	We have made concerted efforts for the exploitation of existing competencies and exploration of new knowledge.	
ICT Capability	ICTC1	We have ICT facilities for smooth operations/services	(Rahman et al., 2023)
	ICTC2	Our firm has established an operative and flexible IT planning process along with our industrial partners	
	ICTC3	Our firm constantly keeps our industrial partners updated with new information technology innovations	
	ICTC4	Our firm creates a climate that is supportive to our industrial partners to try out new ways of using the best use of ICT	
	ICTC5	My firm's business operations are shifting toward digital technologies	
AI-CRM Adoption	AICRMA1	Customary testing of AI-CRM is critical to look at its suitability	(Jaruwanakul, 2024)
	AICRMA2	Quality AI-CRM execution for B2B relationship management enhances the pleasure level	
	AICRMA3	Firms' strategies are aligned with AI-CRM objectives	
	AICRMA4	We have access to data sets for the actual execution of AI-CRM in customer management	
	AICRMA5	Our firm has been able to integrate AI-CRM with our global IT system	
	AICRMA6	We feel that our AI-CRM system will be able to handle the increasing pressures related to customer enquiries	
	AICRMA7	I have faith in the operation of AI-CRM for improving the social sustainability and ultimately, the reputation of our organisation	
	AICRMA8	I am sure that AI-CRM has given us an edge over competitors who are not using such systems	
	AICRMA9	I trust that AI-CRM for B2B relationship management has led to improvement in our market shares	
Competitive Advantage	CA1	Offer competitive price	(Chatterjee, Rana, et al., 2021)
	CA2	Able to offer prices as low or lower than our rivals	
	CA3	Provide customized products	
	CA4	Alter product offering to meet client needs	
	CA5	Cater to customer needs for new features	
	CA6	Offer product that are highly reliable	
	CA7	Offer product that are very durable	

Cont...

Constructs	Items	Questions	Adapted Source
Social Sustainability Performance	SSP1	We are focusing on social sustainable practices and related actions sincerely	(Rahman et al., 2023)
	SSP2	We have developed plans for improving social sustainability	
	SSP3	Our business decisions are made considering the impact on local communities	
	SSP4	We warrant suitable labour working environments	
	SSP5	We have a stringent policy for the prevention of child and forced labour	
	SSP6	We sustain stringent watch on labour rights abuses	
	SSP7	We don't discriminate against people looking at their age, sex, race, religion, etc.	