



---

## ARTIFICIAL INTELLIGENCE POTENTIALS ON RWANDAN COMPANIES PERFORMANCE: BUSINESS VALUE CREATION OF AI-BASED MODELS FOR CUSTOMER SATISFACTION

---

### ABSTRACT

Jean Baptiste Ukwizabigira

Faculty- Information & Communication  
Technology, Kepler College, Rwanda



Corresponding author:  
[ukwijbaptiste@gmail.com](mailto:ukwijbaptiste@gmail.com)

Artificial intelligence is the new direction for future growth of today's business landscape increasing customer satisfaction, systems efficiency and effectiveness, and data-driven decision making. It is a powerful tool to revolutionize business processes and create a competitive advantage. Through a desktop research approach review, this paper investigated the potential of AI-based models to improve performance creating business value through customer satisfaction by Rwandan companies. It examined the potential benefits of adopting AI-based models, and the challenges existing, and drew experience from success stories of Rwandan companies that are one step ahead of millions of steps to be taken. It revealed and concluded that artificial intelligence intelligence-based models create business value by increasing customer satisfaction through improved data-driven decision-making, customer interaction, processes, systems, and infrastructure. It concludes with why Rwandan companies need to position themselves to global competitive advantage by adopting artificial intelligence.

---

**Received:** April 11, 2023

**Revised:** April 26, 2023

**Published:** April 30, 2023

**Keywords-** Artificial intelligence, performance, business value, customer satisfaction, Rwanda.

---

### INTRODUCTION

In his book, *Home Deus*, Jew historian Yuval Harari predicted that algorithms will lead humankind's future through artificial intelligence in the 21st century. Today, it is no longer a prediction but a reality we live in our everyday life. Artificial intelligence has disrupted every business corner and changed business operations, processes and procedures, and the whole ecosystem overall. It is the new trend. Artificial intelligence is substantially transforming business operations with a great impact through automation, ushering in the golden age of prosperity and scaling businesses (Davenport & Ronanki, 2018). Today, nothing can be further than the truth. Humorously, AI is transforming the world of business to scale across borders to achieve customer satisfaction. Given the human potential through innovations and inventions with a unique oppo for thought, judgment, and intention, artificial intelligence is described as computers that respond to stimulus consistently with traditional responses from people (Shubhendu & Vijay, 2013). It is transforming and unlocking human potential and innovations through data analysis to make predictions, decisions, and automation. AI is based on imitating human capabilities and technology pessimists believe that it will outperform humans in all industries in the future. AI uses algorithms to run analyses, interactions, personalized user experiences, and predictions.



AI is helping to achieve customer satisfaction through AI-enabled technologies like real-time data analysis, chatbots, smart assistants, speech recognition, and natural language selection. It is improving companies' customer satisfaction through a combination of preferences and history (Richter et al., 2019). Companies like Netflix and Amazon are using customers' shopping records and preferences to predict their next item or movie of choice and this alters the interaction and prediction of customers. It is rationalizing customer engagement, lowering the costs related to manpower, and highly responsive systems due to automation. The role of AI in business is now non-debatable. As Rwanda is making outstanding strides, digital transformation has been an engine to success and the government has been building blocks to support innovations as part of Vision 2050 strategy. To accelerate technological advancement, the government has been attracting large-scale investments and sensitizing entrepreneurs to advance in using highly sophisticated technologies. In 2019, Rwanda National Police introduced human-like artificial intelligence robotic cameras to fine people violating traffic rules and enhance road safety (Bertrand, 2021). During Covid period, Rwanda launched anti-epidemic robots using AI to fight against COVID-19 (UNDP, 2020). As the government of Rwanda is responding to different country's needs using different technologies supported by AI, a few Rwandan companies have adopted Artificial intelligence to boost their operations, reduce costs, and improve their customer satisfaction. As the number of workforces skilled in AI is still low, universities like Carnegie Mellon and AIMS are offering masters in Engineering Artificial Intelligence (MS EAI) and African Masters of Machine Intelligence respectively. Moreover, researchers have not yet explored AI business value creation to customer satisfaction for Rwandan companies to explore the niche.

This investigated the use of AI, how people perceive quality service, and how AI affects consumer attitudes and satisfaction with a focus on Rwandan companies to analyze how AI integration can lead to better AI-supported improved customer satisfaction and provide practical and theoretical contributions. A desktop review was conducted to investigate and explore the literature around AI potentials for value creation and customer satisfaction for Rwandan companies to contribute to business theory for value creation using AI for customer satisfaction and serve as a model for companies operating in Rwanda.

As AI is the new ingredient for business operations, governments have also identified the need for AI-enabled systems and economy, and are adjusting their policies. It is in this line this article also explored set out the policies for AI frameworks to enhance relationships with customers in Rwanda.

## Literature review

### The current state of AI in business

Businessmen and women jump out of their skins today when you talk about the impacts AI could have on their businesses. Over the years, AI has been a game changer at a pace that never happened before in all industries to drive and advance innovation, and data-driven decisions, performance, and customer satisfaction. It has potentially revolutionized the definition of business in all sectors from retail, finance, law, health, supply chain, manufacturing, education, and even governments themselves and this is supported by predictive analytics which helps to improve operations and gain competitive advantage in this volatile business world.

AI ranges from machine learning technologies used in image recognition, medical diagnosis, speech recognition, robotics, chatbots, predictive analytics, and statistics. When these technologies are leveraged, they position companies for tremendous opportunities with the use of advanced algorithms to perform different tasks which help in cost reduction, scaling businesses, and analysis. In 2022, the survey conducted by McKinsey, showed that AI adoption globally was



2.5times higher than in 2017 and the number of AI capabilities organizations use doubled from 1.9 in 2018 in 2018 to 2.8 in 2022 these technologies are helping to automate processes, and data analysis and prediction, and customer satisfaction (McKinsey, 2022).

Today, companies like Google, Netflix, and Amazon are benefiting from digital data applications. They are applying AI to personalize customers' interests and predict the search we are likely to make, the movie we would watch, or a product we can order referring to the trends of searches, and past experiences, and this helped in customer demand forecast and marketing. When 2022 was ending, ChatGPT has gone viral as the new AI tool text-based tool and this showed a high increase in computer and human interaction pressing concerns over the future of education models and work (Johnson, 2022).

### **The Impact of AI on customer satisfaction**

In 1995, Makridakis predicted that information undoubtedly will have revolutionized business, healthcare, services, work, and education by 2015(Makridakis, 1995, p. xx). Today's business world's fundamental axiom is built on using technology to improve customer satisfaction. Real-time customer interaction is becoming a niche and a differentiation factor as customers are thirsty for quick and personalized customer service. Before AI comes into play, businesses were still correcting and analyzing but they had issues with efficiency and effectiveness in predictions and analysis. Modern AI is based on all-encompassing strategies that focus on customers and address their problems. Companies must comprehend the thoughts and feelings of their customers(Zaki et al., 2021).

In online shopping, chatbots have taken the stage in increasing customer interaction and customizing the experience with a reduced cost. Facebook is generating millions from marketing chatbots that are customized and interact with customers to achieve sales targets. The start of 2016 has been chatbot breakthrough for Facebook as it introduced it and has seen a significant increase today(Zarouali et al., 2018, p. xx). AI is being deployed to answer customer support issues and automate processes. AI can synchronize data from various sources and databases, including those used by enterprises in healthcare, finance, construction, B2B, IT, etc., and can draw conclusions from billions of data points(Ramaswamy, 2017, p. xx). AI is a goldmine that is ensuring customers are remembered by linking data from services, voice channels, marketing, internal customer management systems, and processes(Forbes, 2021).

In education, AI tools are applied to detect students' plagiarism, auto-grade students, and draw insights into the student's progress. The same is being applied in health sectors to track health trends using tools like smartwatches and robots are impacting the production industry greatly to the extent that some jobs requiring manpower have now been taken by robots(Yarlagadda, 2017, p. xx).

According to a study from Dendesk published in 2020, 98% of people have utilized an online FAQ, help center, or other self-serve resources, and 65% believe that customer service is currently more responsive than it was five years ago(Zendesk, 2020). With this growing concern, AI is the solution to challenges like these to provide quick support and the best customer experience which also reduces costs that go with manpower and can serve many at once. All these add value to the business. Schiner in his paper predicted that In 2020, 85% of all customer interactions will be handled without a human agent and the



number is still growing as the obsession with automation is constantly increasing (Schneider, 2017). Firms are required to integrate innovation into their values and adopt new AI technologies for growth and profit.

Overall, businesses have been using AI to increase customer satisfaction at a speed never existed before in all different sectors to maximize operations including but not limited to the decision, making, marketing, and customer service. In the financial and banking sectors, chat powered are responding to customers' queries at a high speed, and many people more than a person can do it. In a study done by Accenture in 2018 found that Banks that invest in AI and human-machine collaboration at the same rate as top-performing businesses could boost their revenue by an average of 34 percent and their performance by 14 percent by 2022 and chatbots increase customer experience (Accenture, 2018). In healthcare, AI has shown a significant impact in pushing healthcare industry operations forward from medical records, customer support, surgery, analysis, and prediction of disasters leading to improved decision-making and level of trust (Asan et al., 2020). AI has also revolutionized the transport sector up to self-driving cars which was taken as mission impossible 20 years ago and improved personalized and efficient transport services through automation. In the IBM report "Beyond Bots and Robots - Exploring the unrealized potential of cognitive computing in the travel industry", IBM reported that 63% of respondents use advanced analytics to improve performance and that cognitive computing is the new game changer (IBM, 2016).

AI is the present and the future of customer satisfaction and experience and needs to be a cornerstone for companies operating in Rwanda and elsewhere to ensure success. The government needs to set regulations benefiting the community at large and invest in infrastructure and innovation to continue a warm welcome of AI in business for customer satisfaction.

### **Rwandan companies and Artificial intelligence**

As Rwandan companies are taking strategic approaches and investing in technology business models to improve customer satisfaction, very few companies have so far deployed artificial intelligence to predict future expectations and analyze the relationship between various factors and behaviors of customers. Rwandan companies haven't yet nurtured and adopted AI's full potential to win the dog-eat-dog fight in business artfully.

Digital Umuganda a Rwandan startup company is playing its cards to leverage AI where it is using voice technologies to ease access to information and services to reduce the digital divide and has launched MBAZA A.I chatbot using natural language processing to ease accessing information. Its system came into play during Covid-period and has helped citizens to access covid information 24/7 anywhere serving quickly people beyond the capacity the human being would have as it serves many people at once and synchronizes historical data to provide updated results/information (Digital Umuganda, n.d.). In Health, Viebeg is using AI to deliver in-time automated medical products to save lives and has been working with hospitals like King Faisal Hospital and Legacy Clinics to improve hospital operations by offering a wide range of medical supplies in-real time and improve customer satisfaction. It makes sure that healthcare institutions have the exact medical supplies in-store by managing supply chain activities and more than two million people were treated by its products (African Development Bank Group, 2022). Zorabots Africa of Zorabot - a Belgian company deployed robotics using AI to curb Covid-19 spread in Rwanda that was taking another level by introducing 5 robots (Kazuba, Ikirezi, Mwiza, Ngabo, and Urumuri) as international flights were re-opening and Urumuri had the ability to screen 50 to 150 people per minute and report abnormalities to officers on duty (WHO, 2020). This company is working now with the government of Rwanda strategically in improving using AI and robotics across different sectors and many companies will benefit from and learn from it.



Pindo which is also a Rwandan start-up in the communication industry with a target of scaling in East Africa is using AI to build communications for machines and people where algorithms are pinpointing real-time data for the customers and programming SMS (Pindo, n.d.). Umurava, a tech startup specializing in talent Management and Ed-tech with a focus on the in-demand areas of the digital economy is also building a vetting platform supported by AI which will ease recruitment processes for companies by using algorithms to analyze data of candidates (Umurava, 2021). Charis UAS is also disrupting data collection and analysis systems in Rwanda by coupling drones with AI to provide capture insights of their partners with minimal risks and errors compared to human-kind and is now working with the government of Rwanda to fully integrate drone technology in fighting and ending malaria (Kagina, 2023).

To support and regulate the adoption of artificial intelligence, the Rwandan government launched the Center for Fourth Industrial Revolution to drive and ensure policy and governance tools as the country is speeding up using technology in all services for economic growth and leapfrog the digital arena to move to middle-income countries. In collaboration with MINICIT -Rwanda Ministry of ICT & Innovation, Rwanda Utilities Regulatory Authority - RURA, The Future Society, and GIZ/FAIR Forward, the government of Rwanda launched an AI policy in 2020 to set a blueprint for the adoption of AI by setting governing rules and also ensure the ethical standards (World Economic Forum, 2022). As companies continue to deploy AI in their services, the policy continues to be improved and the center is working with multiple stakeholders to set frameworks, laws, and policies around chatbots, robots, and AI in general across key sectors including but not limited to health, education, business, etc. which will help to achieve sustainable development goals.

## Methodology

This paper used desktop research methodology to conduct a comprehensive review and analysis of existing data on artificial intelligence potentials on Rwandan companies' performance: business value creation of ai-based models for customer satisfaction. It involved a thorough semantic analysis to gain insights and meta-analysis to synthesize results from different research papers and identify key indicators. Literature search and review was done on secondary data using online databases such as JStor, Google Scholar, Scopus, ProQuest, and organizations that are key players like African Development Bank Group, IBM, UNDP, and World Economic Forum. It involved qualitative analysis using thematic analysis to identify common trends, themes, and patterns in the literature connected to artificial intelligence potentials on Rwandan companies' performance.

## RESULTS

The analysis of existing literature revealed that Rwandan companies haven't yet explored the beauty of Artificial Intelligence in business. They are still sleeping though the government has started to enable the adoption by setting up the Center for Fourth Industrial Revolution which has the mandate to speed up inclusive and responsible adoption of emerging technologies and the business models they serve by identifying, designing, and testing systems, laws, and procedures to enable technology adoption focusing on artificial intelligence, machine learning and data governance (World Economic Forum, 2022). The analysis found that the government of Rwanda is developing an artificial intelligence adoption strategy using an agile approach to support businesses, and agencies, and attract potential investors focusing on AI ethics, guidelines, and implementation. The country is creating a high-tech ecosystem with the collaboration of various stakeholders to achieve Vision 2050 targets.

The paper found that there is still a very low number of skilled professionals in AI which is among the factors a few companies adopted and only 2 universities (Carnegie Mellon Africa and AIMS) are working toward capacitating the next generation of tech experts in AI. As the number of AI talents in natural processing, machine learning, and data engineering



---

with the ability to develop AI-based models increases, Rwandan companies will experience a tremendous transformation in driving business value which is customer-centered and increased customer satisfaction.

As the concerns around the ethics of technology and worry of replacing human-kind jobs in the future continue to grow and Rwanda is still growing in adopting AI, companies need to ensure that they put ethical considerations at the center of AI adoption to ensure data privacy, transparency, inaccuracies, and remove any bias that might happen. This will also ensure that companies do not face penalties from regulatory bodies and adhere to laws and regulations. As we live in a VUCA world (volatile, uncertain, complex, and ambiguous), companies need to make sure that adopted AI-based models are scalable as the demands keep changing and the pressure to constantly improve the processes, infrastructure, and systems to achieve customer satisfaction and data processing (Taskan et al., 2022, p. xx). Companies need to multiply tenfold their speed in creating AI business models and integrate them into their systems to effectively set goals and make sure that they are aligned with vision, mission, and strategy.

Last but not least, the paper found that very few companies in Rwanda are collecting data effectively from their customers. Companies need to make sure that they gather relevant data from their customer base to draw insights and make necessary changes needed to achieve customer satisfaction as a result of applying AI-enabled business models and access to quality data (updated, complete, accurate).

Adopting AI-based models to create business value and customer satisfaction might be costly vis-à-vis small businesses or the growing economy in general and many companies are facing this issue in Rwanda. The government of Rwanda with its key partners needs to attract big companies to operate locally serve as models for local companies, and contribute to capacitating needed personnel in Artificial intelligence, set up needed infrastructures, and create systems for change favoring AI adoption for business value creation and customer satisfaction.

## CONCLUSION

In conclusion, this paper sought to establish the impact of AI-enabled business models on business value creation to achieve customer satisfaction. Generally, it indicated that Rwandan companies haven't yet explored this niche to improve their performance as there are still issues of ethical standards to be followed, low infrastructure, lack of data, and unskilled manpower to support AI-based models for business value creation achieving high customer satisfaction. Adopting Artificial intelligence-enabled business models will significantly impact Rwandan companies' performance and value creation through increased customer satisfaction. By training skilled manpower to innovate and drive AI-enabled business models and scalable, creating ethical guidelines, and investing in infrastructure and quality data, Rwandan companies will experience a significant increase in customer satisfaction and growth as a result of reduced production and operational costs, automation, and customer interaction. This will position them to a competitive advantage not only in the country but also on a global scale. Without any hesitation, AI will drive and revolutionize business growth in Rwanda helping the country to achieve Vision 2050. Further research is still needed in exploring the successful frameworks for implementation and systems for change to drive AI-enabled business models that can disrupt the business landscape.



---

## REFERENCES

- Accenture. (2018). FUTURE WORKFORCE SURVEY - BANKING REALIZING THE FULL VALUE OF AI. [https://www.accenture.com/\\_acnmedia/pdf-77/accenture-workforce-banking-survey-report](https://www.accenture.com/_acnmedia/pdf-77/accenture-workforce-banking-survey-report)
- African Development Bank Group. (2022, October 6). How Rwanda is using artificial intelligence to improve healthcare. African Development Bank - Building today, a better Africa tomorrow. <https://www.afdb.org/en/success-stories/how-rwanda-using-artificial-intelligence-improve-healthcare-55309>
- Asan, O., Bayrak, A. E., & Choudhury, A. (2020, June 19). Artificial intelligence and human trust in healthcare: Focus on clinicians. PubMed Central (PMC). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7334754/#ref35>
- Bertrand, B. (2021, December 17). New traffic cameras to enhance road safety – police. The New Times. <https://www.newtimes.co.rw/article/192136/News/new-traffic-cameras-to-enhance-road-safety-a-police>
- Chen, J. (2022, July 29). Multinational corporation: Definition, how it works, four types. Investopedia. <https://www.investopedia.com/terms/m/multinationalcorporation.asp>
- Davenport, T. H., & Ronanki, R. (2018, January 1). 3 things AI can already do for your company. Harvard Business Review. <https://hbr.org/2018/01/artificial-intelligence-for-the-real-world>
- Digital Umuganda. (n.d.). Chatbot. Digital Umuganda | Building Common Digital Infrastructure for Rwanda. <https://digitalumuganda.com/chatbot/>
- Forbes. (2021, September 1). Anticipate And Predict Individual Customers' Needs With Artificial Intelligence. <https://www.forbes.com/sites/genesyscontactcentercloud/2021/09/01/anticipate-and-predict-individual-customers-needs-with-artificial-intelligence/?sh=6a210f6e3beb>
- IBM. (2016, November). Beyond bots and robots-Exploring the unrealized potential of cognitive computing in the travel industry. <https://www.ibm.com/downloads/cas/NRAV2AL4>
- Johnson, A. (2022, December 7). Forbes. <https://www.forbes.com/sites/ariannajohnson/2022/12/07/heres-what-to-know-about-openais-chatgpt-what-its-disrupting-and-how-to-use-it/?sh=78ba903d2643>
- Kagina, A. (2023, March 27). Featured: Rwanda first African country to fully integrate drone technology in fighting malaria. The New Times. <https://www.newtimes.co.rw/article/6147/news/technology/featured-rwanda-first-african-country-to-fully-integrate-drone-technology-in-fighting-malaria>
- Makridakis, S. (1995). The forthcoming artificial intelligence (AI) revolution: Its impact on society and firms. *Futures*, 27(8), 799-821. <https://doi.org/10.1016/j.futures.2017.03.006>
- McKinsey. (2022, December 6). The state of AI in 2022--and a half decade in review. McKinsey & Company. <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2022-and-a-half-decade-in-review>
- Pindo. (n.d.). Instant communication for a connected world - Pindo. <https://www.pindo.io/>



Ramaswamy, S. (2017). How companies are already using AI. Harvard Business Review, 2-6. <https://hbr.org/2017/04/how-companies-are-already-using-ai>

Richter, R., Gačić, T., Kölmel, B., Waidelich, L., & Glaser, P. (2019, September). A Review of Fundamentals and Influential Factors of Artificial Intelligence. *ijcit*. <https://www.ijcit.com/archives/volume8/issue5/IJCIT080501.pdf>

Schneider, C. (2017, October 16). 10 reasons why AI-powered, automated customer service is the future. IBM. <https://www.ibm.com/blogs/watson/2017/10/10-reasons-ai-powered-automated-customer-service-future/>

Shubhendu, S., & Vijay, J. (2013). Applicability of artificial intelligence in different fields of life. Semantic Scholar | AI-Powered Research Tool. <https://www.semanticscholar.org/paper/Applicability-of-Artificial-Intelligence-in-Fields-Shubhendu-Vijay/2480a71ef5e5a2b1f4a9217a0432c0c974c6c28c?p2df>

Taskan, B., Junça-Silva, A., & Caetano, A. (2022). Clarifying the conceptual map of VUCA: A systematic review. *International Journal of Organizational Analysis*, 30(7), 196-217. <https://doi.org/10.1108/ijoa-02-2022-3136>

Umurava. (2021, July 13). About us. UmuravaWork. <https://umuravawork.com/about-us/>

UNDP. (2020, May 21). UNDP and government of Rwanda deploy smart anti- Epidemic robots to fight against COVID-19! | United Nations development programme. <https://www.undp.org/africa/news/undp-and-government-rwanda-deploy-smart-anti-epidemic-robots-fight-against-covid-19>

WHO. (2020, July 31). Robots use in Rwanda to fight against COVID-19. WHO | Regional Office for Africa. <https://www.afro.who.int/news/robots-use-rwanda-fight-against-covid-19>

World Economic Forum. (2022, March 31). Rwanda launches centre for fourth Industrial Revolution, joins global network. <https://www.weforum.org/press/2022/03/rwanda-launches-centre-for-fourth-industrial-revolution-joins-global-network>

Yarlagadda, R. T. (2017). AI Automation and it's Future in the UnitedStates. *International Journal of Creative Research Thoughts*, 5(1). [https://www.researchgate.net/profile/Ravi-Teja-Yarlagadda/publication/350006531\\_AI\\_Automation\\_and\\_it%27s\\_Future\\_in\\_the\\_UnitedStates/links/604b01f692851c1bd4e290b9/AI-Automation-and-its-Future-in-the-UnitedStates.pdf](https://www.researchgate.net/profile/Ravi-Teja-Yarlagadda/publication/350006531_AI_Automation_and_it%27s_Future_in_the_UnitedStates/links/604b01f692851c1bd4e290b9/AI-Automation-and-its-Future-in-the-UnitedStates.pdf)

Zaki, M., Kennedy, R. M., & Neely, A. (2021, May 4). Using AI to track how customers feel — In real time. Harvard Business Review. <https://hbr.org/2021/05/using-ai-to-track-how-customers-feel-in-real-time>

Zarouali B., Den Broeck, E. V., Walrave, M., & Poels, K. (2018). Predicting Consumer Responses to a Chatbot on Facebook. *CYBERPSYCHOLOGY, BEHAVIOR, AND SOCIAL NETWORKING*, 21, 8. DOI: 10.1089/cyber.2017.0518

Zendesk. (2020, October 6). What is the impact of customer service on lifetime customer value? <https://www.zendesk.com/blog/customer-service-and-lifetime-customer-value/>