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Exploring the scope of AI Tools and Services in improving Consumer Satisfaction: An Empirical Study of Barriers, User Perceptions, and Future Prospects

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Abstract

The research paper has examined the scope of Artificial Intelligence (AI) Tools and Services in creating customer satisfaction. It analyzed the level of consumer satisfaction using AI technologies. It also assessed the barriers and future prospects of AI adoption in Pakistan. The study focused on how organization can leverage AI to improve consumer satisfaction, while also explored general and organization specific challenges in way of AI adoption. The study collected data using survey from diverse segments and conducted data-driven analysis involving both qualitative and quantitative methods to find the impact of AI on business optimization and restricting factors of AI in Pakistan. The findings of the research revealed that privacy concerns, lack of awareness, and trust deficits were identified as major barriers to AI adoption. AI has been perceived to have improved customer satisfaction and increasing number of organizations are willing to use AI to improve their operational efficiencies. In a dynamic landscape, this primary study on AI in the context of Pakistan is pivotal to add value to the existing literature the topic in developing economies. It extended key insights which will benefit all the stakeholders in making informed decision and policymakers to realign policies to take advantage of AI integration in Pakistan.

Keywords: Artificial Intelligence, AI Adoption, Customer Satisfaction, AI Barriers, AI Perception.

Introduction

Artificial intelligence (AI) has been instrumental in transforming all areas of our life, and how the business is performed, reshaping both business operations as well as daily routines across the globe. Research reveals that AI is capable of doing more than just automating processes (Leone et al., 2021). The penetration of AI has been swift in all sectors of the economy worldwide, yet developing nations like Pakistan have still a long way to go to catch up with leveraging the potential of AI (A. Khan et al., 2024). The slow pace of growth in the adoption of AI tools and features are affected by socio-economic and infrastructural challenges that are much greater than the developed countries. There remain challenges such as privacy concerns, limited awareness of the AI's potential, and distrust which constitute the major barriers to widespread AI adoption (Rane et al., 2024).

In order to exploit the potential of AI, the concerns in AI adoption needs to be tackled initially. These issues include ethical, privacy, and regulatory challenges. Despite its potential to streamline decision-making, enhance efficiency and boost economic growth, Pakistan

confronts unique challenges such as infrastructure limitations, cultural attitudes toward AI, and sector-specific adoption barriers in the way to leverage the true potential of AI. Likewise, as AI is a rapidly evolving technology, initiatives such as advance skill development, developing the culture of innovation will reduce the threat of job displacement. (Ranković et al., 2023)

Since, AI is evolving dynamically, the existing literature is scant and previous studies have become obsolete in many cases. The research evaluated the perceived barriers to adoption of AI-powered services. This study aims to provide valuable insights to all the stakeholders including, businesses, consumers and policymakers to accelerate beneficial adoption of AI in Pakistan, by creating a conducive environment. Additionally, Pakistan has unique culture and attitude towards technology which together with distinct economic landscape limits the scope of generalization of studies conducted elsewhere (Jamil, 2021). Moreover, there are less unexplored themes, like challenges faced by consumers, and businesses in Pakistan to fully utilize the potential of AI leading to a need for more focused research on assessment of the influence of demographic factors on the growth of AI in Pakistan. Therefore, there exists major gaps in literature in terms of user experience, skill-sets and awareness that need to be analyzed to promote the growth of AI across the board.

Moreover, there is insufficient AI infrastructure and knowledgebase in Pakistan which restricts the use of AI by both the individuals and organizations, making it necessary to evaluate the practical application of AI and the barriers to its adoption. (Shahzadi et al., 2024) It is generally perceived that Pakistan businesses are reluctant in proactively adopting AI technologies and there is a need to assess the reasons of this delayed and sluggish response towards adopting AI innovations to optimally leverage the potential to create more value for customers. (D. A. Khan et al., 2024)

This study combines multiple perspectives from businesses, consumers, and decision-makers to present a holistic understanding of AI adoption dynamics. The findings of this research will significantly benefit policymakers, businesses, and consumers as it will provide insights into the barriers hindering AI adoption in Pakistan which will help in aligning policies that promote AI-driven innovation, enhance digital infrastructure, and address ethical and regulatory concerns. Likewise, it will offer a deeper understanding of how AI adoption influences customer satisfaction, operational efficiency, and overall competitiveness to businesses. These insights will facilitate organizations develop more effective AI strategies,

optimize customer interactions, and integrate decision-making tools. Additionally, the insights will highlight the benefits of AI technologies, and promote trust in AI-powered services. By bridging the knowledge gap between AI capabilities and public perception, the findings will support a more informed and proactive approach to AI adoption in Pakistan. Therefore, by addressing these gaps through focused research, we can significantly enhance the degree of success of AI adoption and contribute to effective support mechanisms and policies for AI implementation.

Research Questions

The current research investigates the following interconnected queries:

i. Do businesses using AI technologies able to enhance customer satisfaction?

Past studies conducted outside Pakistan provide compelling evidence of significant influence of AI driven customer service on customer satisfaction and overall perceived efficiency (Singh & Singh, 2024). This research assesses the impact of AI technologies on customer satisfaction in the context of Pakistan.

ii. What are the main challenges faced by businesses to adopt AI tools and services?

This study attempts to evaluate the main hurdles in the way of AI adoption in the unique perspective of Pakistan. Research shows that firms face numerous challenges such as technological limitations, data privacy concerns, workforce resistance, and ethical considerations while adopting AI into their operations. If these challenges are addressed amicably, firms can reap the full potential of AI to drive growth, enhance decision-making, and create value on a sustainable basis (Alabi, 2025).

iii. Future prospects of AI being used by organizations to create more value?

Studies suggest that going forward AI is mostly likely to influence marketing strategies involving business models, sales processes and support, as well as customer behaviors. Also, in the future, firms may primarily use AI bots functioning as human salespeople, to make initial contact with sales prospects (Davenport et al., 2020). We build on prior work, to evaluate the perception and likelihood of AI adoption by the firms in Pakistan.

Literature Review

The success of any business largely depends upon the customer experience with respect to customer satisfaction, loyalty, and overall brand perception (Inavolu, 2024). A lot of studies have been conducted globally to measure the prospects of AI in enhancing customer satisfaction through the use of AI, however, Pakistan's perspective is limited. Generally, all

accept that AI is a field of science and engineering involved in making intelligent machines and programs. AI tools mimic cognitive systems to learn or solve problems. These technologies are applied in diverse areas involving natural language processing, web search engines, comprehending human speech, and image recognition etc. which opens up opportunities in wide range of fields including customer services (Na et al., 2022). Meanwhile, incorporating AI tools and services to customer service is transforming how businesses engage with their customers by delivering personalized, efficient, and active support (Inavolu, 2024).

Global Perspective on AI Adoption

The transformative potential of AI has been widely recognized in developed economies, where AI technologies play a critical role in enhancing user experiences, driving operational efficiency, and generating personalized solutions (Alhosani & Alhashmi, 2024). In these settings, AI is often seen as a tool for automation, capable of performing complex tasks previously limited to human intervention (Sarker, 2022). For instance, AI-powered virtual assistants, customer service chatbots, and language translation tools have become integral to daily operations and are well-received by users. However, in developing countries like Pakistan, AI adoption faces considerable challenges due to factors such as limited infrastructure, low digital literacy, and concerns over data privacy (Barikzai et al., 2024). Businesses that chose to adopt Al need to understand the data challenges and modelling requirements for Al deployment and re-evaluation of strategies to effectively reach out more customers. (Mogaji et al., 2021) Businesses have begun to invest millions of dollars in the deployment of digital solutions to fulfil consumer needs, boost productivity, in order to remain competitive as it is perceived to dramatically increase their productivity (Boicu et al., 2012; Demlehner et al., 2021; Mikalef et al., 2022). By transforming data into insightful knowledge, technology enables businesses to satisfy the demands of their clients (Mikalef et al., 2018).

AI in the Financial Sector

One of the industries most impacted by AI technology is finance, where AI has enabled automated and data-driven decision-making processes, particularly in areas like wealth management, loan assessment, and customer service (Liu & Anderson, 2024). AI is facilitating wide range of data-driven decisions, reshaping business models, and creating customer value with its evolving technologies ranging from Machine Learning algorithms to

Neural Networks. Lately, robo-advisors are revolutionizing investment strategies, offering personalized advice with minimal human intervention. Similarly, AI-powered predictive models are delivering greater accuracy in credit scoring, thus transforming lending practice. (Ranković et al., 2023)

AI allows financial institutions to analyze vast amounts of transaction data, enhance financial health recommendations, and streamline loan decision processes. There are some financial tools e.g. Envestnet Intelligence which have the capabilities to predict and converse facilitating in real-time, and data-backed decisions (Ranjan et al., 2020). AI facilitates wealth managers to manage their clients in a better way and develop reports for their customers swiftly allowing them to offer personalized recommendations. Bankers also use AI for making loan decisions in real-time, rendering them more efficient. The capabilities of AI include analyzing payments patterns, assessing risks and find alternative sources of data. (Ranjan et al., 2020). Similarly, other financial management tools such as Transaction Data Enrichment (TDE) provide interpretation of complex transaction strings into readable text which facilitates management and analysis of financial data related to consumers and financial institutions (Sarker, 2022).

In Pakistan's financial sector, the application of AI is promising yet limited due to infrastructural and regulatory constraints (Jejeniwa et al., 2024). AI-driven financial services, including robo-advisors and voice-assisted banking, have the potential to improve customer service and increase operational efficiency. However, concerns such as cybersecurity vulnerabilities, data privacy risks, and the ethical implications of AI-driven decisions are significant challenges (Ranjan et al., 2020). The use of block chain technology to expedite transactions has shown potential for improving efficiency, but the lack of regulatory clarity and public trust hinders broader adoption (Ranković et al., 2023).

Personalized Financial Services involves personalized interface such as robotized budgetary guides and organizers, clients' money related objectives, portfolio management and stock recommendation (Saxena & Muneeb, 2024). Likewise, Smart and Digital wallets have also revolutionized the financial sector in which significant players such as PayPal, Google, Apple, have contributed. This has resulted in reducing the reliance on physical money, subsequently growing the range of services and cashless options (Garbi, 2023). With Voice Assisted Banking, the need to physical presence has been reduced as it engages clients to utilize banking administrations with voice directions and contact screens (Srivastava et al.,

2021). Typical language AI support can process inquiries to respond to questions, discover data, and associate clients with different financial administrations which decreases human-level mistakes while improving proficiency (King, 2010).

Data-driven AI and Block-chain applications are equipped for investigating a colossal volume of information. Such applications are usually installed in end-client gadgets, and monetary establishment servers. These applications are able to create money related plans and techniques through research and can also track the advancements (Ranjan et al., 2020).

AI integration also has some risks associated with it. Top Risks include:

- Cyber-security vulnerabilities of AI.
- Erroneous strategic decisions based on AI based recommendations.
- Regulatory risk of Noncompliance.
- AI failures leading to diminished customer trust.
- Ethical risks arising due to AI adoption
- Legal responsibility of decisions made by AI Systems

The use of AI can potentially transform a business to an enhanced form that is able to offer customized administration, and achieve bigger objectives. However, it has increased the requirements to expand cyber-security dangers to cope up with the emerging challenges (Ranjan et al., 2020). To prevent the risks of evolving role of AI in finance, adaptable and forward-looking regulatory frameworks are imminent (Ranković et al., 2023). Yet, these technologies have the potential to transform the financial industry big time. (Ranković et al., 2023)

Challenges and Risks in AI Adoption

Undoubtedly, AI poses risks, especially regarding cyber-security, privacy, and regulatory compliance which weighs heavily on the benefits it offers like better customer interactions and faster decision-making. Cyber-security risks involve data breaches and misuse of personal information (Rane et al., 2024) while trust deficits in the AI responses couple with limited understanding of AI technology's inner workings algorithms also create fears among users, which get further complicated by concerns of job displacement and biased recommendations (Kumar & Aithal, 2023). Moreover, there are other ethical risks involved in the use of AI, such as the potential biases, incorrect or inappropriate decisions, raising concerns of unaccountability in AI-based responses. Therefore, institutions require careful consideration for the ethical implications of AI deployment, particularly in sectors such as

law, finance, healthcare, and education, where AI decisions can have significant consequences (Ranjan et al., 2020).

Barriers to AI Adoption in Pakistan

There are a wide range of socio-economic barriers in the way of AI adoption in Pakistan spanning form limited tech access, to insufficient digital literacy and lack of awareness. Privacy concerns remain the leading barrier to AI adoption where users are worried about security of the data as well as unauthorized access to their personal information (Barikzai et al., 2024). Moreover, infrastructural limitations act as a prominent barrier where limited or inconsistent internet access and insufficient data storage facilities restricts possibilities of AI usage. Trust deficits related to AI generated recommendations also discourage users from fully engaging with AI-enabled services (Kumar & Aithal, 2023).

Existing studies suggest that Pakistan needs to prioritize awareness and educational initiatives to improve public awareness of the concept and applications of AI to overcome its sluggish penetration. All stakeholders including policymakers, industry leaders, and academia are required to make concerted efforts to create a supportive environment for AI adoption in Pakistan to leverage its benefits for economic development and societal progress. (A. Khan et al., 2024).

Predictive Analysis using Artificial Intelligence

Through the use of predictive analytics (PA), organizations can anticipate future trends and events which provides them an edge over other by allowing for proactive rather than reactive decision-making. (Yerraguravagari et al., 2024).

Predictive Analysis can also be used to track and predict customer behavior, which enable businesses to offer personalized product recommendations in the fields of retail and e-commerce. (Akter & Wamba, 2016) (Balaraman & Chandrasekar, 2016).

AI based predictive models has the potential to boost sales and customer loyalty by evaluating browsing patterns, purchase history, and customers' demographic information (Potla & Pottla, 2024). However, it is essential to ensure ethical and unbiased outcomes. Incorporating, regular audits and assessments of AI algorithms can help identify and correct biases (Mensah, 2023).

Ethical Considerations and Bias Mitigation

Privacy and Data Security*:* Protecting user privacy is difficult yet essential when dealing with large amounts of data. Businesses require to implement strong data security, implement

data protection rules and regulations, and establish distinct data governance practices to prevent unauthorized access and misuse (Ahmad & Khan, 2024).

Transparency of AI Models: AI models in predictive analytics should be transparent and interpretable, especially when used in high-stakes decision-making areas such as finance, healthcare, and criminal justice. Explainable AI techniques allow users to understand the rationale behind predictions, which can increase trust and accountability (Chau, 2024).

Balancing Human Judgment with AI Insights: Predictive analytics should predominantly supplement, not replace, human judgment. Decision-makers should use AI-generated predictions alongside other information, applying their expertise and contextual knowledge to interpret results and make final decisions (Smith, 2023).

Tools for Predictive Analytics and Customization: Different tools offer specialized features for predictive analytics. Python and R provide flexibility for data scientists through a range of libraries, while platforms like IBM SPSS and Microsoft Azure offer enterprise-level solutions with in-built support for machine learning and scalability (Mazumder, 2016).

Predictive Analytics for Sustainable Development: Predictive analytics has potential applications in sustainability by forecasting resource consumption, assessing the impact of industrial processes, and aiding in resource optimization. These insights can support environmentally conscious practices across industries (Bibri, 2018).

ChatGPT and AI in Research

The usage of AI models such as chat generative pre-trained transformer (ChatGPT) for executing different tasks, involving research, idea generation and content writing assistance, is witnessing an exponential growth (Yenduri et al., 2024). ChatGPT by Open AI is an advanced language model capable to produce text responses that closely resemble those of humans. Such AI models use ‘natural language processing’ (NLP) and advanced algorithms, which enables these models to understand the textual prompts and inputs in the same way as any human can do (Yenduri et al., 2024). AI models are trained on large datasets, where the data quality and representativeness can impact their output which are based on patterns learned. However, sometimes they generate responses that sound plausible but are inaccurate, biased, or misleading. This underscores the need of human verification and critical evaluation of AI generated output to ensure the validity and reliability of the research findings. Therefore, AI is a man-made innovation that is susceptible to many limitations, misinformation, and potential errors (Sharma & Ruikar, 2024).

Moreover, AI models may not have access to the most up to date information as they are trained on an existing large dataset; sometimes lead to obsolete or incomplete responses (Deekshith, 2021). Furthermore, comparable prompts and inputs may result in identical outputs when AI assists writers. Unintentional plagiarism may result when these outputs are sent to publications without being carefully reviewed, supervised, or assessed (Sharma & Ruikar, 2024).

Moreover, AI models are not capable to run human based peer review process and lack decision making abilities. This might lead to compromised judgment, creating doubts on the authenticity of the manuscript (Sharma & Ruikar, 2024).

Competition with new entrants like Deep Seek

The competition is intensified with new super-intelligent open-source generative AI (gen AI) such as DeepSeek emerge which posts both extraordinary potential and unprecedented risk. By providing affordable, high-performing, and openly available models like Chinese DeepSeek-R1 and DeepSeek-V3 has disrupted the proprietary dominance of Western AI giants (Sallam et al., 2025). Studies suggest that ChatGPT has more creative strengths while Deep Seek has superior technical aptitude where ChatGPT is better suited for engagement and adaptability and DeepSeek delivers precision in complex tasks (I. S & D R, 2025).

Hypotheses Assessment

The current research investigates the following interconnected queries:

i. Do businesses using AI technologies able to enhance customer satisfaction?
ii. What are the main challenges faced by businesses to adopt AI tools and services?
iii. Future prospects of AI being used by organizations to create more value?

AI enhancing Customer Satisfaction (AICS)

The growing use of AI tools and services to enhance customer satisfaction prompted interest in exploring the extent of value it offers to consumers. According to Rogers' Diffusion of Innovations Theory, understanding and knowledge of new technology play a crucial role in the decision to adopt it (Okour et al., 2021). The more people know a technology, the greater their knowledge of what it can do and likely opinion in favor of doing it. The entity more experienced with AI has more insight into how it positively impacts their industry and how to seamlessly integrate it within their company to attain higher levels of customer satisfaction (Okour et al., 2021).

H1: Organizations using more AI tools and services are likely to create higher levels of

customer satisfaction.

Future Prospect to AI Adoption (FPAI)

AI help streamline operation by taking care of repetitive tasks, analyzing data and aiding businesses to make more insightful decisions. Using AI, companies may offer customized services and improved teamwork, which overall is expected to increase the efficiency of collaborative projects (Paschen et al., 2019). Therefore, it is perceived that there are high prospects of firm-level digital transformation and enhanced AI adoption in organizations for business optimization and customer satisfaction (Oyekunle & Boohene, 2024). Building upon these alternative views, the study evaluates that there is increased likelihood of firms opting for higher AI usage. More specifically, companies are expected to adopting AI to work more effectively with clients in a clearer and more informed way. For that reason, the study puts forward the following hypothesis:

H2: There is a greater chance of firms going for AI implementation in the coming years.

Theoretical Framework

The theoretical framework is built on the following key theories and models:

Technology Acceptance Model (TAM) (Davis, 1989)

The Technology Acceptance Model (TAM) (Na et al., 2022) explains how users adopt and use new technologies. When incorporating a new technology, it has to be user-friendly and should promote work efficiency and increase productivity. AI is more likely to AI improve customer experience and operational efficiency leading to better Perceived Usefulness (PU) and Perceived Ease of Use (PEU). This makes TAM relevant as customer satisfaction is closely linked with better AI interactions which enhance service efficiency, personalization, and overall user experience.

Expectation-Confirmation Theory (ECT) (Oliver, 1980)

The Expectation-Confirmation Theory (ECT) is relevant in this study as customer satisfaction after AI adoption is influenced by Pre-adoption expectations or what customers expect from AI-driven services as well as post-adoption performance such as how well AI meets or exceeds user expectations. It assesses whether AI interactions aligns with expectations and influences satisfaction levels (Bhatnagr & Rajesh, 2024).

SERVQUAL Model (Parasuraman et al., 1988)

The SERVQUAL Model (Saleh & Ryan, 1991) evaluates service quality based on the following five dimensions: reliability, tangibility, responsiveness, assurances and empathy. It

seeks to measures the scope of AI providing accurate and efficient customer service. The accessibility and usability of AI interfaces and AI's ability to address customer queries swiftly. The trust and security customers feel while interacting with AI and its ability to personalize interactions based on customer needs leads to enhanced satisfaction.

Resource-Based View (RBV)

The Resource-Based View (RBV) suggests that firms can gain a competitive advantage and superior performance through unique difficult-to-imitate attributes such as customized AI-driven customer service. Firms investing in AI can create a sustainable competitive advantage in customer service, leading to higher efficiency, automation and satisfaction (Madhani, 2010).

Methodology

The methodology included evaluation based on both qualitative and quantitative research which was then analyzed using econometrics (Creswell & Creswell, 2017). The methodology included compiling a detailed literature review, and evaluating insights from the gathered information which led to develop an understanding of current status of the AI landscape. The information was then mapped in the specific context of Pakistan.

A comprehensive survey was conducted to collect data related to AI perception from individuals, consumers and representatives of organizations across different demographics in Pakistan. The primary data collected through a survey explored status of AI adoption, perceptions, and barriers of AI implementation in Pakistan.

The study was conducted using non-probability sampling involving snowball, convenience and purposive sampling techniques where respondents were requested to forward the questionnaire to others in their networks. The study relied on respondents who were readily available and willing to participate and it mainly focused on individuals, consumers, and organizational representatives potentially having some knowledge or experience of AI.

The survey included a representative sample of 132 respondents across various age groups, educational levels, and professional backgrounds in Pakistan. Data were collected over a three months' period in 2024, ensuring a diverse cross-section of AI users.

In order to understand the scope and use of the AI solutions, a well thought out questionnaire was designed and shared with individuals with diverse backgrounds in an attempt to gather unbiased responses on this topic. The questionnaire was developed through

a collaborative process involving subject matter experts, and researchers. The questionnaire was kept clear, concise, and easy to comprehend, taking just 5-10 minutes to complete. The population surveyed comprised of consumers, organizations, professionals and general public which are directly or indirectly involved in the use of AI based technologies for both personal and business use to gather quantitative data on their perceptions of AI initiatives.

In the introductory paragraph of the questionnaire, it was cleared defined what the survey is attempting to evaluate and how data will be used, ensuring transparency and fostering trust with participants. Respondents appeared to be motivated to fill out the questionnaire themselves, even though help was given, where needed. The data was gathered after the full informed consent of all participants and ensured their anonymity. The use of Likert scales to quantify perceived impact among the qualitative responses also helped in the mixed methods analysis. This strategy enabled us to evaluate the responses of the respondents about AI adoption in the specific case of Pakistan.

Researchers obtained information by sharing the link of questionnaire through social media platforms particularly WhatsApp to ask for their inputs directly. Participants were asked to provide their email addresses and organizational affiliations to verify their professional status along with other demographics.

Topics covered under the survey included general company info, status of AI awareness, and usage, customer experience with AI, preferred tool, perceived advantages and barriers to AI adoption, how AI is reshaping different functions in businesses.

Table 1: ***Summary of Survey Questionnaire***

Section	Variable	Description
Familiarity with AI	Familiarity with AI	How familiar are you with the concept of AI?
	Usage of AI tools	Do you use any AI-powered tools or services in your daily life?
	Preferred AI tools	Which AI tools do you prefer to use?
	Areas of AI usage	In which areas do you use AI tools or services?
AI and Customer Experience	Organizational AI usage	Does your organization use AI in its operations?

	Areas of AI usage in organizations	In which areas is AI used in your organization? (Select all that apply)
	Impact on customer interactions	AI has improved the quality of customer interactions.
	Personalized customer experiences	AI allows for more personalized customer experiences.
	Efficient issue resolution	AI helps resolve customer issues more efficiently.
	Customer satisfaction level	How would you rate the customer satisfaction level in your organization before and after AI implementation?
Challenges and Barriers	Challenges in AI usage	What challenges have you personally faced or observed regarding AI usage?
	Barriers to AI adoption in Pakistan	In your opinion, what are the key barriers to AI adoption in Pakistan?
Future Prospects	Future usage likelihood	How likely are you to use more AI-powered tools or services in the next year?
	Future impact areas	In your opinion, what areas of daily life in Pakistan will benefit most from AI in the future?
	Organizational AI investment likelihood	If you work in an organization, how likely is your organization to invest more in AI technologies in the next 2 years?

On the other hand, the secondary data was compiled from credible sources including research paper, news and journals etc. Qualitative data was evaluated to derive inferences on the efficacy of AI, consumer satisfaction, AI opportunities, risks and challenges while the research findings from the questionnaires are integrated to develop understanding of the AI impact on individuals and organization in Pakistan. The triangulation of data greatly helped with the validity and reliability of the findings.

The Data was then analyzed using the following techniques:

Descriptive Statistics: Statistical analysis covering crosstabs, graphical representations and

frequencies was conducted for survey responses to summarize the descriptive data.

Least Squares Estimation (OLS): Regression was used to analyze customer satisfaction as dependent variable, analyzing its relationship with three key independent variables: the organization's potential investment in AI technologies within the next two years, improvements in customer interactions, and enhanced resolution of customer issues. OLS was used to get the best linear unbiased estimates, and ensure an optimal fit for analyzing the relationship between the variables, making the results interpretable and statistically reliable.

Section 1: Familiarity with AI

The survey revealed that majority of the respondents have greater willingness to use AI tools extensively. Out of the total respondents, ~95% agreed to be familiar with the Artificial Intelligence tools and services while ~86% were actively using AI-powered technologies in Pakistan.

Chart 1: ***Level of AI Familiarity***

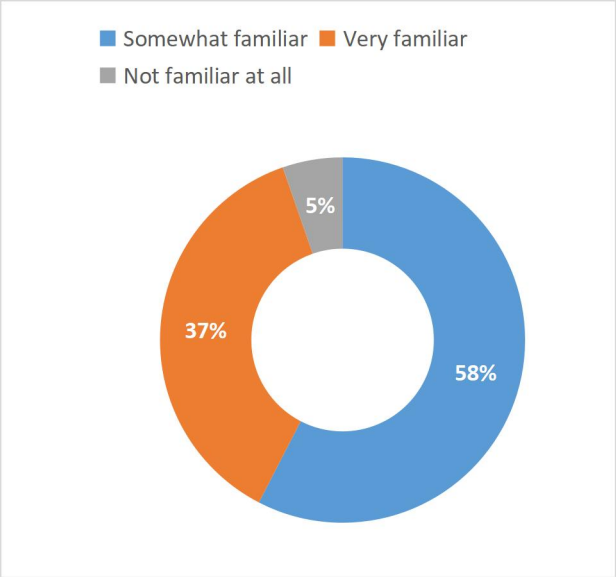
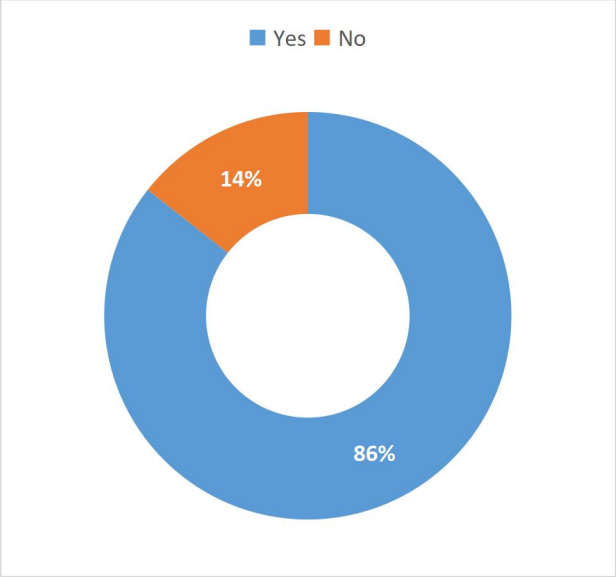


Chart 2: ***Current using AI Tools***



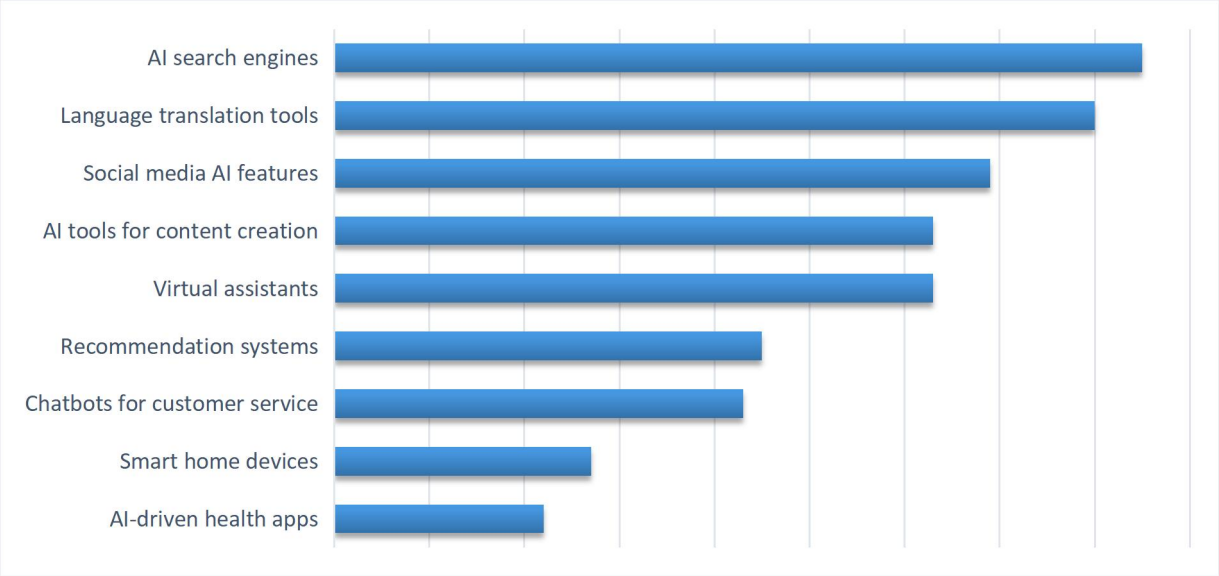
The cross-tab analysis indicated a strong positive relationship between AI familiarity and AI adoption which is evident as AI usage is significantly higher among those who are somewhat familiar (86.8%) and very familiar (91.7%). Hence, it can be suggested that those who are familiar with AI are more likely to expand their use of this technology.

Table 2: ***Cross-Tabulation of AI Familiarity and AI Adoption***

AI Familiarity	No (Not Adopted)	Yes (Adopted)	Total
Not Familiar	5	2	7
Somewhat Familiar	10	66	76
Very Familiar	4	44	48
Total	**19**	**112**	**131**

However, the use of AI tools and services is limited to very narrow range of categories leaving room of expanding the AI usage in diverse segments. The survey revealed that majority of the respondents primarily preferred using search engines, virtual assistants, translation services, and social media AI tools.

Chart 3: *Preferred AI Tools of Participants*



Section 2: AI in Organizations and Customer Experience

AI Adoption by Organizations

Data revealed that a large proportion (45%) of organizations are not currently using AI tools and services in their operations while surprisingly significant respondents were not sure (~20%) about the usage of AI in their organization, reflecting a notable gap of awareness and organizational communication.

Table 3: *Cross-tabulation of AI Adoption and Organizational AI use*

AI Adoption	No	Yes	Not Sure	Total
No	11	3	4	18
Yes	40	36	19	95
Total	51	39	23	113

Chart 4: *Organizational AI Use*

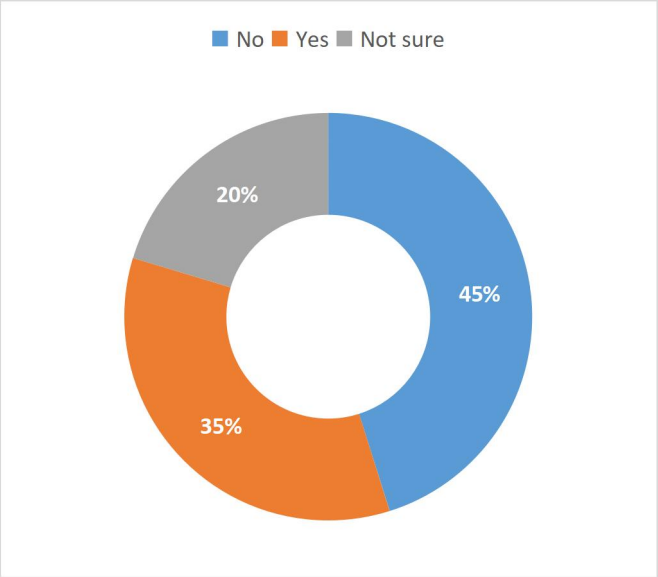
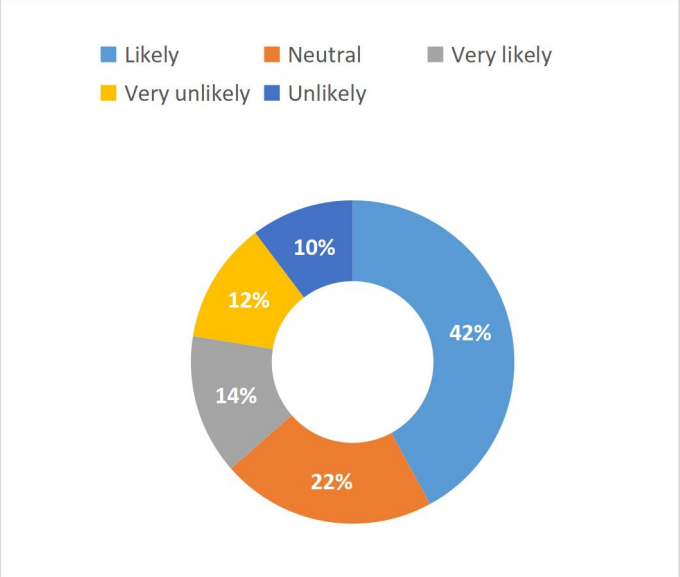


Chart 5: *AI Investment Intention*



Relationship of AI Adoption with Customer Satisfaction with AI Usage

Satisfaction levels with AI-powered services were positive, with 79% satisfied or very satisfied. A large majority (~80%) of respondents who adopted AI reported to have witnessed improved customer satisfaction levels after using AI based technologies in customer engagements. This overwhelming satisfaction depicts a strong correlation of AI adoption with improved customer experience, providing a compelling case for expansion in AI adoption.

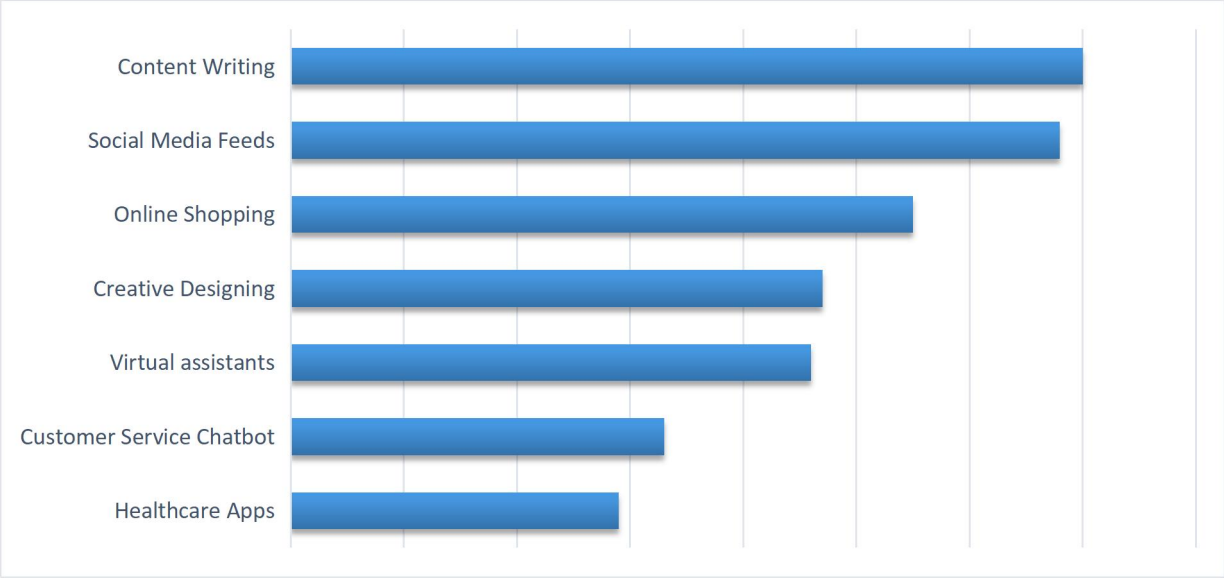
Table 5: *Cross-tabulation of AI Adoption and Its Impact on Customer Satisfaction*

AI Adoption	Significantly Worse	Worse	No Change	Better	Significantly Better	Total
No	1	0	8	8	2	19
Yes	3	3	13	72	21	112
Total	4	3	21	80	23	131

As customer satisfaction is high, majority of the organization are now planning to take the benefits of AI in improving their businesses. Higher usage of AI can provide organizations competitive advantage over those not incorporating AI technologies in their business operations.

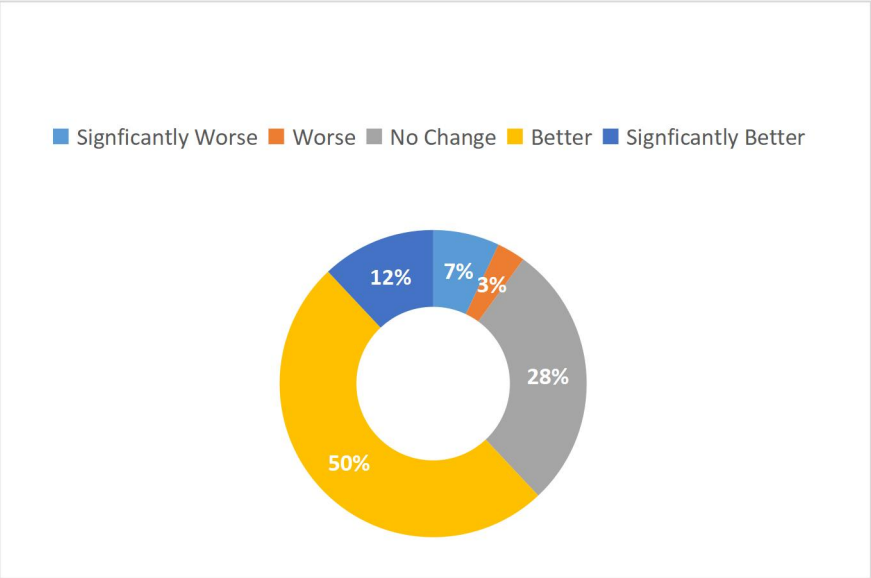
However, even though AI is capable of providing automation and efficiency in wide range of organizational activities, respondents reported using AI mainly in the areas of content writing, and creative designing. This reflects a wide of scope of expansion in the under-utilized AI fields to achieve better efficiencies and customer satisfaction. This also means that AI is still in its nascent stage in Pakistan and there is strong potential of growth of AI in the country.

Chart 6: *Preferred Areas of AI Usage*



The customer satisfaction greatly improved with the use of AI by organizations. Around 62% of the participants believed that AI adoption has improve customer services quality leading to improved satisfaction.

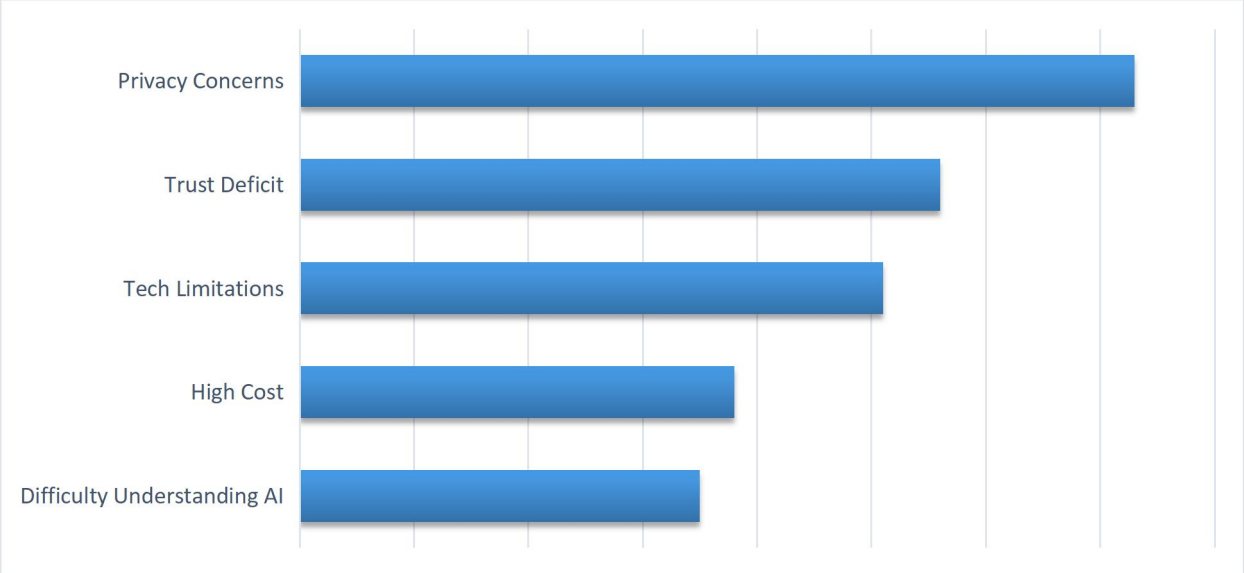
Chart 7: ***Customer Satisfaction Level after AI implementation***



Section 3: Challenges and Barriers

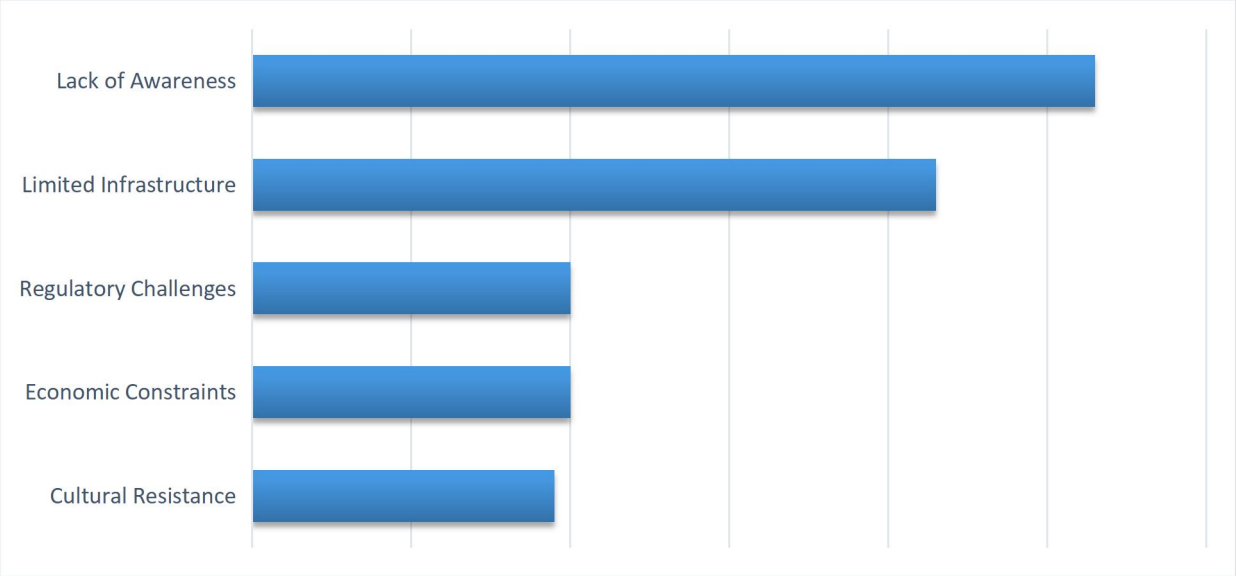
Privacy and trust deficit were the main concerns of the respondents in the adoption of AI. Resolving these challenges will require policy interventions so that the issues of privacy breaches could be addressed amicably.

Chart 8: ***Challenges Faced by Participants in AI Adoption***



While, lack of awareness and limited infrastructure were noted as the main barriers to AI adoption. This implies that strategies to create awareness about the available AI capabilities along with policy intervention to address the Privacy concerns in AI adoption, can greatly benefit in tapping the opportunities created by AI.

Chart 9: ***Barriers faced by Respondents in AI Adoption***

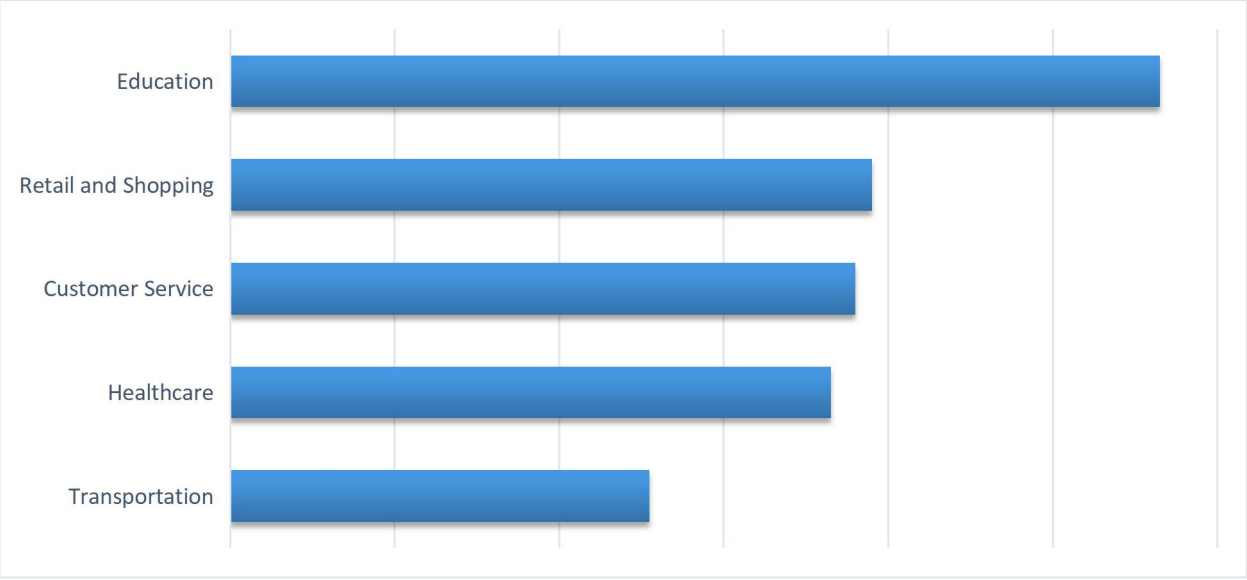


Section 4: Future Prospects

Areas of daily life in Pakistan will benefit most from AI in the future

The survey revealed that AI has higher adoption in the fields of Education and Online Shopping in Pakistan yet majority of organizations have not shifted their function to AI automation, reflecting significant room for AI implementation in Pakistan.

Chart 10: ***Perceived Higher Potential of AI in different fields***



Relationship of AI Adoption with AI Investments by Organizations

On the other hand, the respondents believed that their organizations will likely be inclined to adopt AI tools and services to reap competitive advantage. Most of the respondents (~56%)

were of the view that their firms will be inclined to invest in AI technologies in the next two years revealing a strong growth potential of such technologies. Again, a sizeable portion of participants were unsure of their organizations' plans leading to further substantiate the need of increasing awareness and communication by business entities.

Table 6: ***Cross Tabulation of AI Adoption Likelihood by Organizational AI Investment Over Two Years***

AI Adoption	Very Unlikely	Unlikely	Neutral	Likely	Very Likely	Total
No	4	2	4	4	1	15
Yes	9	9	19	41	14	92
Total	13	11	23	45	15	107

Regression Analysis

The regression analysis of customer satisfaction as dependent variable in relation to the potential of organization investing in AI technologies in the next two years, improved quality customer interactions and enhanced resolution of customer issues revealed some interesting findings. The organizations focusing on AI to improve customer engagements are experiencing tangible improvement in customer satisfaction. On the other hand, AI efficiency on resolving customer issues does not necessarily drive customer satisfaction.

With F-statistic of ~9.4 and Significance less than 0.001, the model is statistically significant, though in only explains 21% of customer satisfaction which indicated that other factors influence satisfaction. Moreover, there is a positive and significant association with customer satisfaction and increased investment in AI technologies ($p < 0.001$) as well as higher AI interactions ($p = 0.024$). On the other hand, AI Efficiency ($p = 0.071$) is negatively impacted with marginally insignificant effect, suggesting that resolving customer issues efficiently does not necessarily increase AI driven customer satisfaction.

Table 7: ***Regression Summary: Impact of AI Factors on the Dependent Variable***

Predictor	Coefficient	Std. Error	Beta	t-value	Sig. (p-value)
(Constant)	2.283	0.340	-	6.706	<0.001
AI Investment	0.346	0.074	0.428	4.671	<0.001
AI Interactions	0.274	0.120	0.381	2.287	0.024
AI Efficiency	-0.227	0.124	-0.305	-1.829	0.071

Discussion

This study evaluated the way AI technologies are gradually taking root in Pakistan, but also highlights some significant hurdles along the way as well as future potential of digital transformation.

Familiarity with AI

Familiarity with AI along play a significant role in encouraging AI adoption. AI satisfaction levels were higher among respondents who were more familiar with AI, depicting importance of awareness and training to fully tap the AI potential. Moreover, the demographic analysis suggested that individuals belonging to younger population with better digital skills are generally more inclined to adopt AI which signify a generational shift in AI adoption also (Kaya et al., 2024). Similar studies also support these findings like (Horowitz et al., 2024) suggest that people with more AI familiarity and better expertise of technologies were more likely to support autonomous applications. Hence, creating awareness of new AI technologies will be instrumental in the country's endeavors of digital transformation.

AI in Organizations and Customer Experience

Interestingly, as most people are satisfied with AI-powered services, along with the potential of AI to make life easier and more efficient which is expected to drive organizations to opt for AI-driven services. According to a study by (Gursoy & Cai, 2024), the use of AI applications indeed offers several benefits, however, its ethical use, and the replacement of human employees, remains a key concern among customers and employees. Moreover, AI-driven personalization, chatbots, and virtual assistants greatly influence consumer experiences across firms. Personalized approach improves customer relationships, satisfaction and loyalty (Bhuiyan, 2024).

Challenges and Barriers

Privacy concerns stood out as the biggest barrier, with many worried about how their data is being used. Additionally, a lack of awareness and insufficient infrastructure are holding back broader adoption, especially among businesses (Iyelolu et al., 2024). This is also supported by existing studies where privacy and trust issues remain major barriers, and these findings are consistent with the case in other developing economies (Shamim et al., 2023).

Future Prospects

Likewise, there were a large number of participants willing to use more AI tools in the next years and majority of organizations were eyeing to invest in AI technologies within the next

two years, which is an encouraging indication that a large numbers of firms and individuals are more likely to adopt AI sooner. While the current level of AI adoption is relatively low in Pakistan, the prospects are great. However, it is apparent that a great deal of policy intervention is required to unlock its full potential as well as to mitigate the inherent challenges.

Conclusion and Recommendations

Pakistan holds immense potential to capitalize on the advantages of AI, however, the obstacles are required to be removed initially to pave way for smooth transition. The power of AI needs to be harnessed effectively and ethically, to create a prosperous and equitable future for the country's economic landscape which will require extensive stakeholder engagements (Ranković et al., 2023).

The study revealed that both individuals and organizations realize the importance of AI and are ready to invest in AI technologies to reap the associated benefits and maintain their competitiveness. In many cases, businesses have invested heavily in AI pilot projects to have an edge and enhance efficiencies through AI automation.

The data reveals that increasing awareness and education about AI will be pivotal in enhancing its adoption. However, only 35% of organizations are utilizing AI advancements in their businesses, indicating that there is limited adoption of AI in the business segment. Yet, 57% are planning to invest in AI technologies for improved business performance and higher sales.

For policymakers, businesses and individuals, the findings of the study emphasize the need to address privacy concerns, build trust and increase public awareness on AI technologies and what is required to benefit from it. Swift adoption of AI technologies will be instrumental in accelerating economic growth and innovation in Pakistan. Challenges like privacy concerns, lack of awareness, and limited infrastructure are required to be addressed at a priority to explore and reap the true potential of AI. AI solutions should be designed to not only resolve issues efficiently but also understand customer concerns comprehensively to offer personalized, context-aware communication will strengthen customer relationships and foster trust. Furthermore, organizations should incorporate human oversight to ensure AI responses align with customer expectations, reducing the robotic effect to the solutions. Likewise, ensuring transparency in AI decision-making will enhance customer confidence in AI-powered systems.

Organizations should make periodic assessments to identify weaknesses in AI-driven interactions and make necessary improvements which will help refine AI-driven services for better customer satisfaction. AI technology has great potential for revolutionizing the way business is conducted, yet it is critical that the adoption of AI is backed by a thoughtful discourse to manage the risks around the tech implementation. AI can open up new opportunities for growth and innovation which will be instrumental in driving economic prosperity in the country.

Limitations and Future Research

The study has the following limitations which impacts its broader generalizability.

- It captures a limited perspective of customer satisfaction, lacking insights from policy and decision makers.
- Dynamic evolution of AI technologies may change the way technologies interact and influence customer satisfaction.
- Various other external factors beyond AI interactions, such as market conditions, economic factors, and competitor strategies are not assessed leaving room for improvements in this study.
- The sample size and geographical scope of the study may limit its generalizability.

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