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Are Indian Consumers willing to share personal data to avail personalized recommendations? - Indian Artificial Intelligence Market Perspective

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ABSTRACT

The willingness of the user to share personal information is an important factor that drives Artificial Intelligence (AI) applications. This study aims to explore the AI beliefs of the consumers who are willing/not willing to share their data with the AI applications. The study was conducted across India by adopting the questionnaire survey method. An Independent sample t-test was conducted on the final sample of 610 respondents to analyze the difference in the means of each of the AI beliefs when divided based on the willingness to share. The results show that the consumers who are willing to share personal data with AI applications have more trust in AI, have a strong preference for AI's recommendations, currently use these applications, are very aware of these applications, have a positive outlook on their performance and desire several AI applications in the future. They are less worried about the dangers of AI in the future and have less negative feedback. Businesses that invest in AI applications need to educate their target consumers about their data policy and strengthen their beliefs about AI so that they are willing to share personal data to avail recommendations. AI-run applications can be a success only when consumers freely share their preferences without any privacy concerns or trust issues.

JEL Classification Codes:M30, M31, M39, M15.

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1. Introduction

Artificial intelligence (AI) uses algorithms and software to think like humans and perform tasks on par with humans (Kumar et al., 2019). It was twenty years back when the AI-enabled recommender systems were developed to offer personalized services to consumers so that the individual needs of the consumers are met, and companies could offer preference discovery and user profiling. The recommendation agents employ artificial intelligence specifically machine learning, computational intelligence, and algorithms to increase the accuracy of prediction and resolve the data sparsity (Zhang et al., 2021). The algorithms used by the AI recommendation agents integrate and quicken the process of information search, evaluate the available alternatives, and the complete decision process by retrieving the preferences of the users and acting on their behalf. They thereby help the consumers make decisions(Kim, 2020). By reducing the information overload, and the complexity of decision-making, recommendation agents offer personalized recommendations to individual consumers (Xiao and Benbasat, 2007). Users who need assistance about searching, classifying, sorting, filtering, and sharing the abundant information available on the internet widely adopt these AI personalized services in the form of recommendation agents or other intelligent software agents to make quicker decisions (Montaner et al., 2003).

Artificial intelligence can predict behavior and suggest recommendations only when the right data is inputted. Behavioral data coupled with demographic and identity data of the consumers helps marketers respond to the actual intent of the consumers and thereby personalize recommendations and provide more fruitful engagement (Epro, 2019). Consumers seem to be ready to accept AI-curated personalized information and alternatives (Kumar et al., 2019). Conversational agents powered by AI like Alexa, Cortona, Siri, Google Home, etc are positioned as personal assistants and provide personalized recommendations to consumers based on the information to which these agents have access. The effect of personalization would be stronger when the content of the persuasive message of these agents reflected the product attributes preferred by the consumers. Irrespective of the level of consumers' involvement with the product recommended by the AI agent, the influence of personalized content is stronger in shaping the consumers' attitude towards that product (Rhee and Choi, 2020).

The investment involved in AI technology is huge and it is important to eliminate risks at an early stage. The challenges for Indian consumers concerning AI technology include displacement of workers, reinforcement of social discrimination, amplification of gender inequality, and exclusion of the less fortunate through targeting (Kalyanakrishnan et al., 2018).In past research, it was documented that Indian consumers' experience of AI was not very pleasant and consumers feared the constant monitoring, the lack of transparency in data collection, the lack of awareness of what data is collected, the sense of helplessness, and the lack of control (Consumers International, 2019). PwC (2018) reported that 93% of the surveyed Indian consumers have data privacy concerns and 57% were only willing to share intrusive data. When the Indian users' expectations, needs and preferences are well captured, AI technology can be a great success in India (Zamora, 2017). It is important to address the data privacy concerns of Indian consumers and build trust so that they are more willing to interact with AI and share data (Chopra, 2019). Hence it becomes important to analyse the Indian consumers' willingness to share personal data with AI applications.

Consumers' willingness to share information is an important construct used in diverse fields like healthcare (Jung et al., 2020; Belle et al., 2021; Karampela et al., 2019); retail (Leppäniemi et al., 2017); data analytics (Perdereaux-Weekes, 2021); artificial intelligence (Chatterjee and Sreenivasulu, 2019; Song and Kim, 2020; Benda and Lind, 2021; Schubert et al., 2018); e-commerce (Al-Jabri et al., 2020; Chen and Rea Jr,2004; Yeh et al., 2018; Evens and Van Damme, 2016; Beldad et al., 2012); etc.. Willingness to share information can be defined as the intention to share relevant information frequently and honestly (Zaheer and Trkman, 2017). The willingness to share information depends on the type of information (Phelps et al., 2000) and it decreases with the increase in information sensitivity (Schubert et al., 2018). However, some consumers trust machines more than humans and also disclose more information to machines owing to machine heuristics (Sundar and Kim, 2019).On the other hand, consumers who value privacy refrain from disclosing personal information as they are less willing to be profiled online (Karwatzki et al., 2017).

The main question this paper aims to answer is: Are Indian consumers willing to share personal data to avail of AI's personalized recommendations? Thus, the objective of this study is to explore the AI

beliefs of the consumers who are willing/not willing to share their data with the AI applications and devices. The main outcome of the study is the profiling of the consumers based on their willingness to share their personal data. The profiling was done based on gender, age, annual income, and AI knowledge level for the various AI beliefs of the consumers. Given the limited knowledge of the researcher, this paper is the first to profile Indian consumers based on their willingness to share personal information with AI. The findings of this paper would benefit businesses to understand their target consumers better and educate them accordingly so that huge investments in AI technology are fruitful. The paper begins with the Literature review section which ventures into the important constructs of Trust in AI, Personalization, and Consumers' willingness to share personal data. The next sections of the paper include the Objective and Hypothesis of the study, the Sample and Methodology, and the Results and Analysis. The paper concludes with the Conclusion and References sections.

2. Literature Review

2.1 Trust in AI

Trust is an important element that helps to comprehend the consumers' perspective of technology and to forecast the usage of technology. When it comes to new technology, developing trust is essential to control the perception of risk and uncertainty (Li et al., 2008). Concerning AI technology also, trust is very important as consumers would follow the recommendations of AI applications only based on trust. This trust can be developed only by repetitive usage which leads to familiarity and the capacity to assess the performance (Xiao and Benbasat, 2007). The trust in AI also has a bearing on the consumers' understanding of AI (Salesforce, 2018). The decision to adopt AI agents is predominately influenced by trust (Wang and Benbasat, 2005) as consumers tend to develop interpersonal relationships with these agents. Only by developing cognitive trust (belief) and emotional trust (attitude), familiarity can be increased and thereby the consumers' intention to adopt rises (Komiak and Benbasat, 2006).

An increasing number of businesses are adopting AI recommendations to enhance the experience of the consumers. However, consumers do not accept these AI recommendations in all contexts. Trust plays an important role in consumers accepting or rejecting these AI recommendations. The main key factor that determines this acceptance is whether the consumers look at the utilitarian value of the product or its hedonic value. When consumers look for utilitarian value in terms of functionality and the practicality of the product, AI recommendations are more preferred by consumers. Hence businesses need to understand the determinants of consumers' trust in AI recommendations (Longini and Cian, 2020). Consumers receive the recommendations of the AI agents only based on trust as they perceive the human traits of benevolence and integrity in them (Wang and Benbasat, 2005). However, consumers tend to resist the AI recommendations if they perceive a risk that following them may not result in the required satisfactory output. This risk can be reduced only by trust(Hughes et al., 2019).

Consumers also perceive AI to lack emotional intelligence though they acknowledge the powerfulness of AI, causing a sense of distrust towards the AI applications. This distrust is due to the lack of vulnerability as AI applications have no issues of wrong judgment and also due to the disappointment caused when the thresholds are exceeded as AI is developed to work only within limited working conditions. Hence creating a foundation of trust is key to advancing AI (Gray, 2017). One of the ways to increase the consumers' trust in recommendation agents is by providing internalization capabilities for the agent, i.e. having the capability to ask the right need-based questions to the consumers to elicit the right desires of the consumers(Benbasat and Wang, 2005). Designing recommendation agents with more transparency for the users would result in both attitudinal and perceptual benefits that would enable the adoption and continued usage of these AI recommendation agents. These agents need to be both transparent and must also need less cognitive effort to be successful and adaptable among the consumers (Bigras et al., 2019).

2.2 Personalization

Personalization is the main component of any interactive marketing strategy. Personalization is intended to modify a standardized service or product to the individual needs of consumers and thereby enhance the value to the consumer. Personalization as opposed to customization is automated by the marketer for the consumer by addressing the consumers' individual preferences (Montgomery and

Smith, 2009). Personalization which initiates by analysing the behavioral patterns of users and data of others who have similar preferences, needs to be handled well with the users' consent without raising privacy concerns (Rhee and Choi, 2020). AI is continuously transforming human lifestyles by offering personalization. Personalization is made possible by recognizing patterns in abundant consumer data using natural language processing, deep learning, and genetic algorithms (Kumar et al., 2019). The recommendation agents should be usable with user-friendly interactions so that the consumers find it easier to adopt them for personalization (Murray and Häubl, 2009).

Personalization aims in "send the right message to the right consumers will (dramatically) increase the effectiveness of communication" (p.137, Postma and Brokke, 2002). Personalization could be offered to the consumers when huge amounts of consumer-related data could be captured. However, there could be decreased rates of adoption and consumer vulnerability owing to the personalization paradox which arises when the consumer data is gathered without consent. Hence the strategy to collect consumers' data needs to be cautiously planned as that is important in determining the consumers' reaction to personalization (Aguirre et al., 2015). There should be very little differentiation between the recommendations provided by the AI applications and the consumers' own decisions for the personalization offered by AI applications to be effective. Consumers tend to develop a sense of unity with the AI agents when they comprehend and embrace the personalization offered. This preference for personalization creates trust and an intent to adopt AI (Komiak and Benbasat, 2006). Though the AI recommendation agents are perceived to be with less expertise or less trustworthy, the consumers' decisions tend to be more driven by AI recommendations rather than the conventional recommendations provided by other sources (Senecal and Nantel, 2004).

2.3 Consumers' Willingness to Share Personal Data

Personalization which involves customizing purchase experiences to the individual preferences of the consumers not only raises the switching costs but at the same time requires consumers to share their valuable customer information. This disclosure might raise privacy concerns and investment in personalization may be undermined (Chellappa and Sin, 2005). Consumers who are privacy sensitive and who consider information transparency are less likely to adopt personalization as they are less willing to be profiled. They experience the personalization-privacy paradox. Consumers who have experienced a prior invasion of privacy would also be more reluctant to personalization and information disclosure(Awad and Krishnan, 2006). When offered personalization, consumers' privacy concerns are dependent on the context of the situation. In an emergency (non-emergency) context, the consumers' intention to adopt personalization (non-personalization) is significantly higher than the intention to access non-personalization (personalization) (Sheng et al., 2008).

The willingness to share personal data depends on several factors. When the number of recipients is huge, the consumers are less willing to share personal data. However, the willingness to share personal data is not reduced by the social distance of the recipients or the extent of personal data a single recipient collects (Schudy and Utikal, 2017). The willingness to share personal information with AI devices depends on the social interaction factor: trust, and the self-interest factors: service quality, usefulness, and enjoyment (Song and Kim, 2020). Among these, enjoyment and service quality are the most influential factors influencing the willingness to share information with AI devices (Song and Kim, 2021). According to Forrester's research, a percentage of consumers are labeled as *skeptical protectionists*. They are those who are very informed and worried about their privacy. Then there are *reckless rebels* who are least worried about sharing their personal information. The last category is *conditional consumerists* who are conscious of privacy but willing to share information for the exchange of value (Britt, 2020).

The consumer's intent to access personalization is influenced by trust. Hence businesses need to first build trust in their consumer relationships before they invest in personalization as personalization in turn demands access to abundant customer information which consumers will provide only if they trust the business (Chellappa and Sin, 2005). Businesses need to also maintain fair information practices and disclose their practice via effective self-regulation to protect the privacy of the consumers (Culnan, 2000). When fair information practices are in place, and consumers are also explicitly informed about it, they would be very willing to share their personal information as there are no privacy concerns (Culnan and Armstrong, 1999).To balance the consumers' personalization and

privacy concerns, businesses need to communicate the value consumers would get in return for disclosing their preferences. Businesses need to build trust by explaining to the consumers in simple terms about which data will be collected, how it will be collected, how it will be utilized, and finally the value that will be delivered (Britt, 2020). Businesses also need to educate consumers about the benefits of personalization and its outcome so that they are more willing to adopt personalization. Businesses also need to target consumers who are more willing to participate in the personalization offering (Awad and Krishnan, 2006).

2.4 Summary of the Literature Reviewed

Aim of the study	Variables of the study	Method employed	Results of the study	Reference
The aim of this study is to examine how AI applications and the imposition of regulatory controls influence the impact of personal data sharing on the human right abuses issues.	• Personal Data Sharing • Human Right Abuses	Structural Equation Modelling	The study shows that the customers who are generally apprehensive about data sharing especially with AI, fearlessly share personal data when they become aware that the use of AI is controlled by regulatory restrictions.	Chatterjee and Sreenivasulu (2019)
The main aim of this study is to identify the factors that lead to high/low willingness to share information with AI fashion robots.	Willingness to share information •Rational self-interest •Service Quality •Enjoyment •Usefulness •Ease of use Social interaction with AI robots •Trust •Sociability •Collaborativeness	Qualitative •Literature review •Personal interview •Focus group interview Quantitative •Decision tree modeling	The study finds that factors like enjoyment, trust, service quality, and usefulness predict the willingness to share information with AI fashion robots.	Song and Kim (2020)
This study aims to explain the perceived concerns and the benefits of AI's influence on the willingness to disclose personal information to AI with AI knowledge acting as the moderator.	•Willingness to disclose personal information to AI •Perceived knowledge of AI •Perceived privacy concerns of AI •Perceived personalization/environmental/health/financial benefits of AI	•Pearson Correlation analysis •Multi-linear regression •Moderator analysis	The findings reveal that the perceived AI knowledge does not have a positive moderating influence on either the benefits or the perceived concerns of AI. The perceived privacy concerns also have a negative impact on the willingness to disclose personal information to AI.	Benda and Lind (2021)
The study explores people's willingness to disclose personal information using two surveys on Amazon Mechanical Turk. The first survey examines if the willingness to share information is dependent on the information type or the person it is shared with. The second survey examines how personalized ads and discounts affect the consumers' willingness to share.	Survey 1: •Own/Family member's private information •Information shared with websites •Privacy protection questions Survey 2: •Purchase history for personalized benefits •Willingness to share purchase history •Informativeness of purchase history •Buying Behavior	Questionnaire survey method	The results show that consumers are more willing to share personal information with people with whom they share a closer relationship. However, the consumers are not prepared to pay more to protect their data and personalized offers and discounts do increase the willingness to share personal information.	Schubert et al. (2018)
This study aims to characterize the individualistic preferences for sharing personal data that vary with the characteristics of potential recipients.	•Willingness to share personal data •Number of recipients with whom data is shared •Social distance	Regression analysis	The study reveals that the willingness to share personal data with unknown recipients decreases with the number of recipients. But, the willingness to share personal data is not reduced by the social distance or the extent of personal data received.	Schudy and Utikal, (2017)
This study aims to determine if procedural fairness can bridge the gap between privacy concerns and willingness to share personal information.	•Willingness to share personal information •Trust •Privacy calculus •Procedural fairness	Discriminant analysis	The findings of the study show that when customers are explicitly briefed about the fair information practices in place, privacy concerns do not segregate the customers who are willing to be profiled online versus those who are not willing to share personal information.	Culnan and Armstrong (1999)

This study aims to determine (i) the information type consumers are most/least willing to disclose (ii) consumers' beliefs regarding the benefits of disclosing personal information (iii) factors influencing consumers' willingness to disclose personal information (iv) trade-offs consumers are most/least willing to make when they exchange personal information for shopping benefits.	•Willingness to provide different types of personal information •Beliefs regarding direct mail, information practices, and information control	Multivariate Regression analysis	The results show that the efforts of self-regulatory and public policy to reduce privacy concerns should give the consumer more control over disclosing personal information. The willingness to disclose information also varies with the information type.	Phelps et al., 2000
This study argues that consumers empowered with the knowledge of data privacy regulatory knowledge influence their willingness to disclose personal information.	•Willingness to disclose •Privacy risk concerns •Privacy expectations •Regulatory protections •Trust •Culture	•Confirmatory Factor analysis •Structural Equation Modelling	The results reveal that when data privacy regulations are in place, consumers have a higher perception of data protection control.	Perdereaux-Weekes (2021)
This study aims to determine the factors that encourage as well as hinder the consumers' willingness to disclose personal information online.	•Willingness to disclose personal information •Privacy concern •Perceived disclosure benefits •Privacy assurance	•Exploratory factor analysis •Hierarchical regression analysis	The study finds that the perceived information disclosure benefits have a significant positive relationship with the willingness to disclose personal information online whereas the privacy concerns have a significant negative relationship. Privacy assurance does not influence the information disclosure.	Al-Jabri et al. (2020)
This study aims to explore the drivers of internet users' willingness to disclose personal information. It also investigates the moderating nature of extrinsic rewards.	•Willingness to provide personal information •Information privacy concerns •Extrinsic rewards •Experience of privacy invasion •Big Five personality dimensions	Structural equation modeling - Partial least squares method	The results show that privacy invasion, agreeableness, and risk-taking propensity are the antecedents of information privacy concerns. And the users' willingness to disclose personal information is not significantly influenced by privacy concerns.	Yeh et al. (2018)
This study aims to determine the influence of the hypothesized factors on the online personal information disclosure for the various e-government services among Dutch users who have/do not have previous online government transaction experience.	•Behavioral intention to disclose personal information •Expected benefits •Trust •Risk perception •Legal protection •Quality of previous online transaction	Structural equation modeling	The findings reveal that trust in government organizations is an important determinant of personal data disclosure intention. The users would be more willing to disclose personal information to e-government services when the risk perceived is low; the benefits expected are large and there is a strong belief in legal protection.	Beldad et al. (2012)

The consumers' willingness to share personal data has been analyzed by these studies to determine the influence of various variables like human rights abuse (Chatterjee and Sreenivasulu, 2019); social interaction (Song and Kim, 2020); perceived AI knowledge and perceived benefits of AI personalization (Benda and Lind, 2021); social distance (Schudy and Utikal, 2017); privacy calculus and procedural fairness (Culnan and Armstrong, 1999); beliefs regarding information practices and information control (Phelps et al., 2000); privacy risk concern and regulatory protection (Perdereaux-Weekes, 2021); perceived disclosure benefits and privacy assurance (Al-Jabri et al., 2020); extrinsic rewards (Yeh et al., 2018); risk perception and legal protection (Beldad et al., 2012) using various methodologies in different countries. None of these studies have explored the Indian consumers' willingness to share personal data, especially with the AI applications. The previous studies have also restricted their analysis only to a few variables. Moreover, this study encompasses most of the variables covered in the previous studies like Personalization Preference,Trust in AI, Current usage of AI, Knowledge about AI, and also new variables like Awareness of AI, Future Dangers of AI, Positive outlook on Current AI Performance, Negative outlook on Current AI Performance and Desired Applications of AI. All the dimensions of Indian consumers' AI beliefs concerning their willingness to

share personal data are covered in this study, hence making this study's findings an original contribution to research especially in the Indian AI Consumer market.

3. Hypothesis development and Objective of the study

AI technology involves huge investments in terms of resources like money and time and hence it becomes important to eliminate risk at a very early stage. The Indian consumer market has many challenges about the AI technology amplification of gender inequality, displacement of workers, and exclusion of the less fortunate through targeting and reinforcement of social discrimination (Kalyanakrishnan et al., 2018). Hence it becomes important to check the AI beliefs of the Indian consumers as the crux of AI applications depends on the willingness of the consumer to share personal information.

Studies like Consumers International (2019) and PwC (2018) show that Indian consumers have not felt very comfortable with AI and have feared the lack of transparent data collection, the constant monitoring, and the lack of control. They have had data privacy concerns as well. It is important to first assess the beliefs of the Indian consumers about AI, and then educate them on their negative AI beliefs and strengthen their positive AI beliefs. Only then AI technology can be a great success in India Zamora (2017) and Chopra (2019) believe that the expectations, preferences, and needs of Indian consumers need to be studied and addressed so that the Indian consumers would be more willing to interact with AI and AI would be very successful in India.

The previous studies (Chatterjee and Sreenivasulu, 2019; Song and Kim, 2020; Benda and Lind, 2021; Schudy and Utikal, 2017; Culnan and Armstrong, 1999; Phelps et al., 2000; Perdereaux-Weekes, 2021; Al-Jabri et al., 2020; Yeh et al., 2018; Beldad et al., 2012) which analyzed the consumers' willingness to share personal data have not taken into account all the beliefs of AI and no study has been done in the Indian consumer market, especially in AI. Hence the objective and the hypothesis of the study have been formulated as follows in line with the literature gap identified and the need for the study derived.

The main objective of the study is to explore the consumers who are willing/not willing to share their data with the artificial intelligence (AI) applications in terms of the consumers' beliefs about AI. Hence the null hypothesis of the study is:

> **H0:** There is no difference in the means of each of the AI beliefs among the groups of respondents divided based on the willingness to share personal data.

4. Sample and Methodology

The population of the study involves Indian consumers residing all over India and who are knowledgeable about online e-commerce communication. The data was collected via the questionnaire survey method and the survey was conducted through the Google Forms application. The sampling techniques employed are convenience and snowball sampling (Goodman, 1961). These sampling techniques are justified as a huge sample was required from a hard-to-reach population (Gile and Handcock, 2010). The sample involved respondents residing in the main metropolitan cities of India like Kolkata, Delhi, Bangalore, Mumbai, Chennai, Cochin, Hyderabad, and Pune. This Indian consumer market survey collected 1028 valid responses. Out of these responses, 112 respondents were willing to share their data so that AI could provide personalized recommendations, 498 respondents were not willing, and the balance 418 respondents were not sure of their preference. Hence this balance group of 418 unsure respondents were not included in the final sample of 610 respondents.

5. Results and Analysis

This study aims to explore the AI beliefs of the consumers who are either willing/not willing to share personal data which could help enhance AI recommendations. The consumers' willingness is an important factor as it is the main input data for several AI applications and businesses invest huge resources in developing such AI applications. Understanding the relationship between this willingness and consumers' beliefs about AI would help businesses invest in the right AI applications.

To first measure the consumers' beliefs about AI, 44 statements were coined based on literature review via ground research, and using the questionnaire survey method, responses were measured on a

Likert scale. These variables were then reduced to nine factors via Principal Component Factor analysis and rotated via Varimax rotation. These factors were named the different AI beliefs based on the variables loaded on each factor. These variables include Personalization Preference, Trust in AI, Current usage of AI, Knowledge about AI, Awareness of AI, Future Dangers of AI, Positive outlook on Current AI Performance, Negative outlook on Current AI Performance, and Desired Applications of AI. The descriptives of the factors derived in the Principal Component Factor analysis along with the reliability score of Cronbach's alpha are shown in Table A1 in the Appendix.

An Independent sample t-test was adopted to analyse the difference in the means of each of these AI beliefs when divided based on the willingness to share personal data for AI recommendations. The results are as follows in Table 1.

Table 1. Independent sample t–test results

S.No	Factor	Mean		t-value	p-value for one tail test
		Willing to share	Not Willing		
1	Trust in AI	0.24675	-0.0722	2.996	0.0015
2	Knowledge about AI	0.05615	-0.11633	1.571	0.0585
3	Personalization Preference	0.796944	-0.37664	11.477	0.000
4	Current Usage of AI	0.198904	-0.14407	3.195	0.0005
5	Awareness of AI	0.14533	-0.03505	1.646	0.05
6	Positive Outlook on Current AI Performance	0.122731	-0.10588	2.082	0.019
7	Future Dangers of AI	-0.27909	0.00815	-2.701	0.0035
8	Negative Outlook on Current AI Performance	-0.14923	0.145923	-2.719	0.0035
9	Desired Applications of AI	0.209467	-0.11417	3.015	0.0015

As shown in Table 1, the results were significant for all the factors except for the factor of knowledge about AI. Hence consumers who are willing to share personal data with AI applications have more trust in AI, have a strong preference for AI's personalized recommendations, currently use AI applications, are very aware of AI and its applications, have a positive outlook on the performance of AI and desire several AI applications in the future. On the other hand, they are less worried about the dangers of AI in the future and have less negative feedback on the present AI performance.

5.1 Gender Profiling

To further explore this relationship, the sample was divided based on different demographics. The first grouping was done based on the gender. The sample consisted of 265 male and 345 female consumers out of a total 610 consumers. The Independent sample test results are shown in Table 2 below.

Table 2. Independent sample t–test results – Gender profile

S.No	Factor	Male				Female			
		Mean		t-value	p-value for one tail test	Mean		t-value	p-value for one tail test
		Willing to share	Not Willing			Willing to share	Not Willing		
1	Trust in AI	0.351652	-0.01408	2.4	0.0085	0.101672	-0.11121	1.388	0.083
2	Knowledge about AI	0.153633	0.034709	0.826	0.205	-0.07867	-0.21769	0.827	0.2045
3	Personalization Preference	0.869752	-0.45753	8.516	0.000	0.696251	-0.32236	7.385	0.000
4	Current Usage of AI	0.214518	-0.15179	2.398	0.0085	0.17731	-0.13888	2.025	0.022
5	Awareness of AI	0.233193	0.110365	0.816	0.2075	0.023817	-0.13264	0.964	0.168
6	Positive Outlook on Current AI Performance	0.024124	-0.07362	0.614	0.27	0.259102	-0.12753	2.47	0.007
7	Future Dangers of AI	-0.19041	-0.01857	-1.128	0.13	-0.40173	0.026085	-2.788	0.003
8	Negative Outlook on Current AI Performance	-0.17032	0.2465	-2.714	0.0035	-0.12007	0.078421	-1.257	0.105
9	Desired Applications of AI	0.244559	-0.15938	2.695	0.0035	0.160935	-0.08382	1.544	0.062

5.2 Age Profiling

The next profiling was done in terms of the age of the consumers. Young consumers who are 25 years and below were 107; the middle-aged consumers who are between 26 to 45 years were 289; 214 were above 45 years, and the older consumers. The results of the Independent sample t-test are given below in Table 3.

Table 3. Independent sample t–test results – Age profile

S.No	Factor	Young Consumers			Middle-aged Consumers			Older Consumers		
		Mean		p-value for one tail test	Mean		p-value for one tail test	Mean		p-value for one tail test
		Willing to share	Not Willing		Willing to share	Not Willing		Willing to share	Not Willing	
1	Trust in AI	0.312115	-0.19907	0.0055	0.296772	-0.06337	0.0175	0.105871	-0.03234	0.234
2	Knowledge about AI	0.193839	0.031896	0.2165	0.085695	-0.02381	0.2585	-0.12924	-0.29961	0.200
3	Personalization Preference	0.88017	-0.26713	0.000	0.543525	-0.38026	0.000	1.083325	-0.41637	0.000
4	Current Usage of AI	0.07259	-0.08419	0.2425	0.247554	-0.11098	0.0155	0.257712	-0.21241	0.0075
5	Awareness of AI	0.053316	-0.04348	0.329	0.152347	-0.035	0.1275	0.229911	-0.03169	0.104
6	Positive Outlook on Current AI Performance	0.077735	0.014975	0.3795	0.225936	-0.1307	0.0205	0.017552	-0.12201	0.241
7	Future Dangers of AI	-0.20527	0.103154	0.0895	-0.20153	0.072506	0.0535	-0.46913	-0.11605	0.0215
8	Negative Outlook on Current AI Performance	0.166064	0.064377	0.334	-0.24705	0.210423	0.0025	-0.33071	0.093314	0.016
9	Desired Applications of AI	0.251718	-0.21523	0.0165	0.265894	-0.1777	0.005	0.083018	0.011401	0.3465

5.3 Annual Income Profiling

The annual income earned was used for the next profiling. The low-income consumers with an income of Rs. 4 lakhs and below were 234, the average-income consumers earning between Rs. 4.01 and Rs. 10 lakhs were 171, and the higher-income consumers earning more than Rs. 10 lakhs were 205. The results of the Independent sample t-test are given below in Table 4.

Table 4. Independent sample t–test results – Annual Income profile

S.No	Factor	Low-Income Consumers			Average-Income Consumers			Higher-income Consumers		
		Mean		p-value for one tail test	Mean		p-value for one tail test	Mean		p-value for one tail test
		Willing to share	Not Willing		Willing to share	Not Willing		Willing to share	Not Willing	
1	Trust in AI	0.400362	-0.15803	0.0005	0.093903	-0.2112	0.066	0.221191	0.151774	0.353
2	Knowledge about AI	-0.14167	-0.24634	0.2895	0.002267	-0.02999	0.436	0.269811	-0.03364	0.0475
3	Personalization Preference	0.957912	-0.26283	0.000	0.622186	-0.45266	0.000	0.780681	-0.44865	0.000
4	Current Usage of AI	0.152937	-0.14473	0.0375	0.115397	-0.18442	0.065	0.299729	-0.10839	0.020
5	Awareness of AI	0.158095	-0.23548	0.020	-0.19326	-0.03711	0.234	0.378151	0.209228	0.148
6	Positive Outlook on Current AI Performance	0.263438	-0.10762	0.019	-0.00507	-0.012	0.487	0.090519	-0.1849	0.071
7	Future Dangers of AI	-0.28275	0.031566	0.040	-0.18797	0.126049	0.053	-0.34155	-0.12207	0.114
8	Negative Outlook on Current AI Performance	-0.0301	0.062373	0.305	-0.0311	0.286025	0.05	-0.33968	0.125931	0.0075
9	Desired Applications of AI	0.049152	-0.12997	0.1615	0.082251	-0.20597	0.0785	0.442853	-0.01572	0.005

5.4 AI Knowledge Level Profiling

The AI knowledge level was used as the last dimension for profiling the consumers. Consumers with low AI knowledge levels were 194, those with average AI knowledge levels were 243, and with higher AI knowledge level were 173. The results of the Independent sample t-test are given below in Table 5.

Table 5. Independent sample t–test results – AI Knowledge profile

S.No	Factor	Low AI Knowledge			Average AI Knowledge			Higher AI Knowledge		
		Mean		p-value for one tail test	Mean		p-value for one tail test	Mean		p-value for one tail test
		Willing to share	Not Willing		Willing to share	Not Willing		Willing to share	Not Willing	
1	Trust in AI	0.182053	-0.16388	0.0595	0.267642	-0.10545	0.022	0.254175	0.117761	0.2175
2	Knowledge about AI	-0.36001	-0.28128	0.383	0.193116	-0.03645	0.1085	0.101969	-0.01089	0.234
3	Personalization Preference	0.612135	-0.29541	0.000	0.922067	-0.467	0.000	0.768763	-0.34225	0.000
4	Current Usage of AI	-0.70671	-0.36565	0.0695	0.147494	-0.0837	0.108	0.562359	0.076952	0.001
5	Awareness of AI	0.120475	-0.20223	0.1125	0.196495	0.037182	0.1855	0.115624	0.086562	0.431
6	Positive Outlook on Current AI Performance	0.185658	-0.16877	0.078	0.290616	-0.03185	0.038	-0.02653	-0.13939	0.263
7	Future Dangers of AI	0.223751	0.056556	0.2325	-0.41742	-0.04753	0.0145	-0.35496	0.031743	0.0205
8	Negative Outlook on Current AI Performance	0.286687	0.116751	0.2435	-0.23809	0.122908	0.020	-0.23844	0.227397	0.0055
9	Desired Applications of AI	0.029984	-0.16684	0.2205	0.257973	-0.02836	0.052	0.237201	-0.18251	0.0065

The results in Tables 2, 3, 4, and 5 show that different factors are significant for different demographic dimensions.

6. Discussion of Results

The following findings could be derived from the profiling done in Tables 2,3,4 and 5:

Trust in AI: The results show that male; young; middle-aged; low-income; or the average AI knowledge level consumers are more willing to share their data to avail personalized recommendations via AI applications as their trust in AI is more. Hence Trust in AI is an important factor influencing the consumers' willingness to share personal data. These results are consistent with most studies like Benda and Lind (2021); Kushwaha et al. (2021); Chen and Rea Jr (2004); Beldad et al. (2012) and Sundar and Kim (2019)which show that Trust is an important factor influencing the consumers' willingness to disclose information.

Knowledge about AI: Concerning the knowledge dimension, it was found that the results were significant only for the higher-income consumers. Hence higher income consumers are more willing to share their data to avail personalized recommendations via AI applications owing to higher levels of knowledge about AI. Therefore, Knowledge in AI is an important factor influencing the consumers' willingness to share personal data. These results are not consistent with the findings of Benda and Lind (2021) who report that AI knowledge level does not have a positive moderating influence on the perceived benefits of AI.

Personalization Preference: This factor was significant for all the profiles of gender, age, annual income, and AI knowledge level. Hence male; female; young; middle-aged; older; low income; average income; higher income; low AI knowledge level; average AI knowledge level or high AI knowledge level consumers are more willing to share their data to avail personalized recommendations via AI applications as they have a stronger preference for personalization. Hence, Personalization preference is an important factor influencing the consumers' willingness to share personal data. These findings are in line with the results of Karwatzki et al. (2017)and Awad and Krishnan (2006) which report that personalization influences the consumers' willingness to disclose information.

Current Usage of AI: With respect to the current usage dimension, the results are significant for the male; female; middle-aged; older; low income; higher income, or higher AI knowledge level consumers. Hence these consumers are more willing to share their data to avail personalized recommendations via AI applications as they currently use AI applications. Therefore, the current usage of AI is an important factor influencing consumers' willingness to share personal data. No prior studies have analyzed the influence of this factor on consumers' willingness to share personal information.

Awareness of AI: Concerning the awareness dimension, it was found that the results were significant only for low-income low-incomeconsumers. Hence low-income low-incomeconsumers are more willing to share their data to avail personalized recommendations via AI applications owing to the higher awareness about AI. Therefore, the awareness of AI is an important factor influencing the consumers' willingness to share personal data. No prior studies have analyzed the influence of this factor on the consumers' willingness to share personal information.

Positive outlook on current AI performance: In this dimension, the results were significant for the female; middle-aged; low-income and average AI knowledge level consumers. Hence female; middle-aged; low-income or average AI knowledge level consumers are more willing to share their personal data to avail personalized recommendations via AI applications because of their positive outlook on current AI performance. Therefore, the Positive outlook on current AI performance is an important factor influencing the consumers' willingness to share personal data. These results corroborate the findings of Al-Jabri et al. (2020) which document that when the positive outlook in terms of perceived benefits of information disclosure is high, consumers are more willing to disclose personal information.

Future dangers of AI: The results were significant for the female; older; low income; average AI knowledge level and high AI knowledge level consumers for this dimension. Hence female; older; low-income; average AI knowledge level or high AI knowledge level consumers are not willing to share their personal data with AI applications because they are worried about the future dangers of AI. Therefore, the future dangers of AI are an important factor influencing the consumers' willingness to share personal data. These results corroborate the findings of Beldad et al. (2012) who report that only when the perception of future risk is lower there is a higher disclosure of personal information.

The negative outlook on current AI performance: This factor was significant for the male; middle-aged; older; average income; higher income; average AI knowledge level and high AI knowledge level consumers. Hence the male; middle-aged; older; average income; higher income; average AI knowledge level or high AI knowledge level consumers are not willing to share their personal data with AI applications owing to their negative outlook on the current AI performance. Therefore, the negative outlook of AI is an important factor influencing the consumers' willingness to share personal data. This result is corroboration by the findings of Chatterjee and Sreenivasulu, (2019) who document that a negative outlook on AI has a significant influence on the consumers' willingness to disclose personal information to AI.

Desired applications of AI: With respect to this dimension, the results are significant for the male; young; middle-aged; higher income, and higher AI knowledge level consumers. Hence male; young; middle-aged; higher income or higher AI knowledge level consumers are more willing to share their personal data to avail personalized recommendations via AI applications because they desire several AI applications in the future. Therefore, the desired applications of AI are an important factor influencing the consumers' willingness to share personal data. No prior studies have analyzed the influence of this factor on the consumers' willingness to share personal information.

7. Implications and Limitations of the Study

This study has covered a diverse range of consumers' beliefs about Artificial intelligence (AI), most of which have not been covered in earlier research. The consumers' willingness to share personal information concerning each of these beliefs has been analysed and the profiling of consumers in terms of gender, age, annual income, and AI knowledge level has also been completed. This study is the first attempt in the Indian consumer market to analyze all the AI beliefs of consumers and also to provide detailed profiling of consumers who are either willing/not willing to share personal information. This detailed profiling and AI belief analysis could help businesses target the right consumers, understand them better, and also educate them to develop the right AI beliefs so that the consumers are more willing to share their personal information and thereby make AI investments a huge success. Businesses should focus on (i) increasing the consumers' trust in AI (ii) increasing the consumers' preference for personalization (iii) increasing the consumers' current usage of AI (iv) improving the consumers' awareness of AI (v) clearing the consumers' fears about the future dangers of AI (vi) improving the consumers' positive outlook on AI performance (vii)increasing the consumers' knowledge about AI(viii) reducing the consumers' negative outlook on AI performance

and (ix) encouraging the consumers' desire for future AI applications. Thus, businesses can develop AI beliefs which strongly influence the consumers' willingness to share personal information. The government bodies should also support AI investments by having the right data protection policies in place so that consumers are more encouraged and more willing to share their personal information with AI applications.

This study is limited to only nine AI beliefs of the consumers derived from the Principal Component Factor analysis. There could be more beliefs and important factors that consumers consider valuable before sharing personal information with AI applications. Future research could look at other AI beliefs not covered in this study. The profiling of consumers is also limited only to the four profiles of gender, age, annual income, and AI knowledge level. Future research can look into profiling of consumers based on other variables. The findings of this research cannot be generalized to a global population as the study is limited to the Indian population characterized by a unique culture. This study can be replicated in other geographical regions and comparison among countries can also be done to attain a global perspective.

8. Conclusion

This study aims to investigate the AI beliefs of the consumers who are willing/not willing to share personal information and preferences with the AI applications. By employing the questionnaire survey method, the sample of 610 respondents was surveyed across India. The nine AI beliefs were derived using Principal Component factor analysis from 44 statements which measured the various beliefs about AI. An Independent sample t-test was used to analyze the difference in the means of the various AI beliefs when divided based on the consumers' willingness to share. The results showed that consumers who are willing to share personal data have high Personalization Preferences,Trust in AI, Current usage of AI, Awareness of AI, Positive outlook on Current AI Performance, and Desired Applications of AI. They are less worried about the future Dangers of AI and Negative outlook on Current AI Performance. The results were further explored by profiling the respondents based on gender, age, annual income, and AI knowledge level. The tests were found to be significant for every profile. The results of the study with this elaborate profiling could help businesses understand the various factors that influence the consumers' willingness to share personal preferences with the AI applications. Businesses could create better transparent AI applications if they understand the consumers' beliefs and preferences better. Businesses need to educate the consumers and develop their beliefs about AIso that they willingly share their personal preferences to the AI applications.

Appendix:

Table A1. Descriptives of the Factors derived in Principal Component Factor Analysis

S.No	Factors	Factor Loading	Cronbach's alpha
1	**Trust in AI**		
A	I would trust AI to provide financial or legal advice	0.549	0.883
B	I would trust AI to drive a car or other passenger vehicles	0.604	
C	I would trust AI to serve as soldiers, security, police, fire or military services	0.707	
D	I would trust AI to perform a medical procedure and offer health advice	0.727	
E	AI machines can do the job of piloting public transport better than humans in terms of safety and efficiency	0.695	
F	AI machines can do life-saving surgery better than humans in terms of safety and efficiency	0.746	
G	AI machines can do military/fire-fighting jobs better than humans in terms of safety and efficiency	0.766	
H	AI machines can do agricultural jobs better than humans in terms of safety and efficiency	0.621	
I	AI machines can do cooking jobs better than humans in terms of safety and efficiency	0.646	
2	**Knowledge about AI**		
A	Siri and other virtual assistants employ AI technology	0.729	0.933
B	Netflix, prime and other OTT media services employ AI to personalize content based on preferences.	0.845	
C	Amazon, Flipkart and other online shopping portals employ AI to personalize shopping recommendations	0.882	
D	Facebook, YouTube and other websites employ AI to personalize content	0.879	
E	Swiggy, Zomato and other food delivery services employ AI to send personalized recommendations	0.821	
3	**Personalization Preference**		
A	I am willing to share personal purchase data to get personalized recommendations on items I may want to purchase.	0.773	0.892
B	I am willing to share personal medical data to allow a doctor to make a better diagnosis or recommendation about my health treatment using AI.	0.775	
C	I am willing to share personal data to allow the government to provide me with better and more personalized public services using AI.	0.849	
D	I am willing to share personal financial preferences to allow a financial advisor to help determine better investment choices for me using AI.	0.838	
E	I am willing to share personal browsing history to allow social media handles to provide me with better personalized content recommendations using AI.	0.77	
4	**Current Usage of AI**		
A	I am using Office Intelligent services for their extra functions to make my work better.	0.668	0.821
B	I am using Virtual assistants (Siri/Alexa/Google assistant/Cortana) to complete my daily tasks.	0.726	
C	I am using smart email categorization, smart reply options and efficient spam filters to personalize my email.	0.751	
D	I am using chatbot and other AI enabled service operators to solve my customer service enquiries.	0.756	
E	I follow the personalized recommendations given by social networking sites like Facebook, OTT media services like Netflix, shopping portals like Flipkart and others.	0.582	
5	**Awareness of AI**		
A	I have seen/heard that computer programs which show me websites or advertisements based on my web browsing habits	0.628	0.816
B	I have seen/heard that computers that can recognize speech and answer questions	0.741	
C	I have seen/heard that facial recognition computers which can learn identities through CCTV video to catch criminals	0.736	
D	I have seen/heard that driverless vehicles which can adapt to road and traffic conditions	0.754	
E	I have seen/heard that robots which can make their own decisions and can be used by the armed forces	0.574	

6	**Positive outlook on Current AI Performance**		
A	AI can provide the same, if not better, levels of customer service than a human can today	0.691	0.827
B	AI knows all the facts and policies better than many customer service representatives I've dealt with	0.692	
C	Getting customer issues resolved without human interaction is faster and less of a hassle dealing with an AI-powered chatbot or phone operator	0.687	
D	AI has a big positive impact on my personal life via shopping and customer service with personalized recommendations and AI enabled service operators	0.668	
E	AI has successfully provided personal customized content on all my social handles which I follow	0.64	
7	**Future Dangers of AI**		
A	I fear that in the future robots will eventually uncover my deepest secrets	0.763	0.713
B	I fear that AI will take over, replace all jobs, and possibly one day, replace humans.	0.724	
C	I fear that AI immersion into my daily life will improve them, but also make them a lot less personal and intimate	0.782	
8	**Negative outlook on Current AI Performance**		
A	I prefer dealing with a real person when I have a customer service issue	0.655	0.746
B	AI has screwed up in the past and not dealt with my problem satisfactorily	0.704	
C	Don't see AI having an impact on my personal life because I don't trust AI to help at all.	0.743	
D	I do not like the idea of a robot being used by companies to communicate with their customers	0.751	
9	**Desired Applications of AI**		
A	I want fully autonomous vehicles that are far safer	0.663	0.793
B	I want robots to assist with my day-to-day physical activities	0.691	
C	I want houses and offices that react instinctively to users' needs	0.754	

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