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Brand Credibility as A Moderator Between Ai-Driven E-Commerce Applications and Consumer Trust and Purchase Intention

Saba Hashmi[1], Dr.Shreya Panwar[2]
[1,2]Faculty of Management and Commerce Swami Vivekanand Subharti University, Meerut. UP, India.

ABSTRACT
The swift implementation of the Artificial Intelligence (AI) technologies into the e-commerce platforms has revolutionized the online consumer experience by allowing personalization, intelligent suggestions, chatbots, and automated decision-making apparatus. As much as AI-based apps can help in improving efficiency and convenience, its success in terms of consumer trust and purchase intention depends on contextual factors. In this research, the moderating role of brand credibility is examined and the relationship between AI-driven e-commerce applications and consumer trust and purchase intention is studied. In a quantitative research design, information was gathered among online consumers that had the previous experience of AI-based e-commerce platforms. The hypothesized relationships were tested using Structural Equation modeling (SEM). The results also show that consumer trust and purchase intention are greatly affected by AI applications, and brand credibility enhances the relationship between them. The paper adds to the existing literature on the adoption of AI in e-commerce by showing brand credibility as an important boundary condition and providing a strategic perspective on how e-commerce companies can capitalize on AI technologies..
Keywords: Artificial Intelligence, E-Commerce, Brand Credibility, Consumer Trust, Purchase Intention, Moderation Analysis

INTRODUCTION:

The fast-growing digital technologies have entirely changed the environment of commercial operations, specifically with the incorporation of Artificial Intelligence (AI) within e-commerce websites. Online retailing has taken the shape of a basic transactional web site over the last ten years to an advanced digital ecosystem that utilizes smart algorithms that can learn about consumer behavior. Recommendation systems, virtual assistants, chatbots, dynamic pricing mechanisms, visual search, and predictive analytics are all AI-oriented applications that have become the part of the modern e-commerce platform. By using these technologies, companies can analyze large amounts of consumer data in real time, predict customer needs, personalize content, and automate decision-making processes, making them more efficient in their operations and providing their customers with better experiences. With the growing competition in the online markets, e-commerce companies aim to use AI-supported solutions to make a difference and keep long-term relationships with customers.

The increased use of AI in e-commerce has dramatically changed the character of relations between users and online platforms. In contrast to the conventional online shopping platforms, AI-powered platforms are actively involved in the decision-making process of consumers by proposing products, answering questions, and affecting pricing and promotional policies. Even though such smart interactions are convenient and efficient, they are also associated with new problems regarding transparency, control, and data privacy. The issue of information gathering and processing by AI systems, as well as their use, is still unclear to many consumers, which is why the concepts of surveillance, data manipulation, and data abuse are the concerns. These issues are especially high in situations where AI systems are run independently, with minimal human oversight, and thus understanding or predicting the behavior of a system is not easily achievable by consumers.

Consumer trust is one of the key questions, in this regard, when it comes to the success of AI-based e-commerce platforms. Trust portrays how a consumer is ready to trust a platform with uncertainties and perceived risks of conducting online transactions. Trust in technology-mediated environment is not merely dependent on system performance and usability but also on expectations of security, safeguarding of privacy and ethical use of data and trustworthiness of automated decision process. Even though AI technologies are meant to be more accurate and efficient, their complexity and inability to be explained may destroy the trust, especially in the group of consumers who do not have a high level of familiarity with such high-tech technologies. Consequently, the very existence of AI-driven features is not always related to positive consumer attitudes and behavioral intentions.

The literature on e-commerce and information systems indicates that technological sophistication is not enough in encouraging consumer acceptance. Although it is true that AI application can enhance perceived usefulness, ease of use, and personalization, such functional advantages do not necessarily lead to consumer confidence and readiness to pursue purchase behavior. Rather, trust is an intermediary process which bridges technological characteristics and behavioral consequences including purchase intention, loyalty, and continued use. As the consumers trust an e-commerce platform, they tend to believe AI-driven recommendations, provide personal

information, and transact. On the other hand, low trust may diminish the effectiveness of AI applications, irrespective of its technical power.

In this changing digital landscape, brand-related aspects are so important in determining consumer perceptions and responses to AI technologies. The credibility of the brand, specifically is a valuable signal which mitigates information asymmetry and perceived risk in online transactions. A plausible brand is usually seen to be truthful, trustworthy, and competent, and the features which are particularly invaluable in the environment that is characterized by uncertainty and technical complexity. Brand credibility in e-commerce contexts may reassure users that AI-based systems are designed and executed in their best interest thus extinguishing worries of misusing data, algorithmic partisanship, and opportunistic behavior.

Established brands with a high reputation might have a specific edge in the implementation of AI-based applications because consumers tend to believe in automated systems provided these systems are linked with reputable and well-known brands. These brands will be able to use the goodwill they have built to create the assurance of trust in AI-enabled interactions and prompt consumers to trust the suggestions, respond to chatbots and make purchases on algorithmic suggestions. Otherwise, less known or less reputable brands could experience more difficulties in securing the trust of the consumers, despite the use of the same AI technologies. It implies that the credibility of brands can be an important contextual dimension influencing consumer perceptions and reactions to AI-based e-commerce applications.

Although AI and branding are increasingly becoming significant in online trading, most of the available empirical studies have largely looked into the constructs separately. Although there are many studies on the impact of AI functionalities on consumer satisfaction, trust, and purchase intention, there have been comparatively limited references to how brand credibility could work as a boundary condition that mediates the relationships. On the same note, branding studies have been more inclined towards the traditional online shopping experiences, and little has been done on AI interactions. The absence of an integrative study forms a key gap in the research on the relationship between technological and brand-related aspects and the role they play in consumer behaviour in modern e-commerce settings.

This is an especially crucial gap to fill because of the growing usage of AI technologies in various e-commerce sites, starting with large marketplaces and ending with new digital stores. The needs of consumers regarding transparency, ethical actions, and brand responsibility will likely get stronger as they start learning about the consequences of AI-driven decision-making and the appropriateness of such a solution. The interaction between brand credibility and AI-based applications to influence consumer trust and purchase intent could be of interest to both researchers and professionals. This knowledge can be used to create a more efficient AI strategy that will not only result in functional improvements but also in a more consistent brand philosophy and consumer satisfaction.

It is within this context that the current research aims at investigating the moderating effect of brand credibility in the correlation between AI-based e-commerce applications and the most essential consumer behavioral responses, i.e., the trust and purchase intention. The study will combine insights of AI adoption literature, e-commerce, and branding literature to help gain a better insight into consumer reactions to intelligent digital platforms. By so doing, it helps to continue the expanding body of research on AI-enabled commerce, and provide a useful reference tool to e-commerce companies aiming to exploit the AI technologies without losing and damaging consumer confidence.

2. LITERATURE REVIEW

The emerging mass of evidence on artificial intelligence in e-commerce demonstrates its revolutionizing effect on the experience of online consumers. The general concept of Artificial Intelligence in e-commerce is the use of machine learning algorithms, natural language processing, and computer vision as well as advanced data analytics to automate processes and increase consumer and digital platform interactions. The initial research conducted by Davenport and Ronanki (2018) pointed out that AI applications can help companies transition past rule-based automation and towards intelligent systems that have the ability to learn on consumer data. Recommendation engines based on AI have proven to be much more beneficial in product discovery and decision making efficiency in the e-commerce environment by following the browsing history, buying behavior, and taste preferences (Ricci, Rokach, and Shapira, 2015). In a similar vein, Huang and Rust (2021) also found that AI-based chatbots and virtual assistants improve responsiveness and availability of service, which positively impacts the perceived service quality. Empirical studies to the same effect by Kumar et al. (2021) also established that predictive analytics and dynamic pricing systems help in enhanced inventory management and customized promotions that result in a higher level of customer satisfaction. Taken together, these studies indicate that AI-based applications facilitate perceived efficiency, personalization and convenience, which are necessary factors of positive user experiences in online shopping settings.

Even though the functional advantages of AI technologies are undeniable, the issue of consumer trust is one of the primary problems in commerce mediated by technology. The degree of trust in e-commerce has been widely studied as a multidimensional phenomenon representing the perceptions of reliability, security, privacy preservation, and good will of online services. Gefen, Karahanna, and Straub (2003) contended that trust eases social uncertainty and enhances willingness among the consumers to undertake online transactions. Pavlou (2003) also provided more emphasis that trust is crucial in reducing the perceived risk in relation to electronic commerce especially in the setting characterized by information asymmetry. Since the advent of AI-based solutions, the concept of trust has been complicated. Although AI may be more accurate and faster, it tends to work as a black box and thus consumers are not in a position to know how it arrives at the decisions. The relevant research by Shin (2020) and Castelo, Bos, and

Lehmann (2019) suggested that in the case of high system performance, the absence of transparency and explain ability in AI systems can decrease consumer trust. These results indicate that the belief in AI-driven e-commerce does not depend on technological efficiency only but also on the perception of power and transparency, as well as moral information use, among consumers.

Purchase intention has traditionally been known as one of the most important outcome variables in consumer behavior studies that describe the probability of having a person consider the purchase behavior in future. Purchase intention depends on the technological and psychological factors in the e-commerce situations. A study conducted by Kim, Ferrin and Rao (2008) has shown that trust is among the most powerful predictors of online purchase intention which tends to mediate the interaction between the system characteristics and the behavioral outcome. More recent research has extrapolated this point of view to AI-enabled environments. As an example, McLean and Osei-Frimpong (2019) concluded that consumers were more willing to use AI-related suggestions and buy products when they believed that those systems were helpful and reputable. Likewise, Gursoy et al. (2019) found that there are positive benefits of AI-based personalization, namely, the mitigation of cognitive effort and perceived risk, which has a beneficial influence on purchase intention. Nevertheless, such implications will depend on the trust that consumers have on the platform, which is why the core of the issue of trust in converting AI capabilities into real purchase behaviour.

In this line of study, brand-related variables have become very important indicators that shape consumer perception in the online space. The degree to which consumers believe that a brand has the capability and the willingness to perform on what it pledges is called brand credibility and is based on signaling theory suggested by Spence (1973). Erdem and Swait (2004) conceptualized brand credibility as a process that minimizes perceived risk and information costs, which make decision-making in the face of uncertainty easier. It has been revealed that brand credibility in e-commerce environment has positive effects on trust, attitude, and purchase intention (Baek, Kim and Yu, 2010). The factor of brand credibility is even more acute as AI technologies make online interactions more complicated. Dwivedi et al. (2021) opined that powerful brands had the ability to justify the application of state-of-the-art technologies by sending signals of trust and social conscientiousness. Brand credibility, in AI-enabled setting, can assure consumers that automated processes are made to safeguard their interests, manage its data without any care, and provide equitable results. According to empirical results provided by Choi and Lee (2020), consumers are more accepting of AI-based.

When it comes to services, it is perceived to be better when it is linked to reputable brands compared to brands that are not well known and offer similar technological features.

Despite the fact that the past research has contributed greatly to the current knowledge on the application of artificial intelligence, trust, and purchase intention in e-commerce, the available literature has exhibited remarkable gaps. The direct impact of AI-driven features on consumer outcomes has been the topic of much of the AI-centric research in which trust is viewed as a mediator variable or an outcome variable (Shin, 2020; Huang & Rust, 2021). Simultaneously, branding scholarship has mostly analyzed the credibility in the traditional online shopping environment, and this analysis has not explicitly taken into consideration the existence of intelligent, autonomous systems. Very few studies have combined both technological and brand related perspectives and only a few have empirically explored brand credibility as a moderating variable in AI mediated e-commerce contexts. As a result, a lack of knowledge still remains on the issue of whether and how the condition of brand credibility predetermines the effectiveness of the AI applications in influencing consumer trust and buy intention.

It is this loophole that is especially problematic given that AI technologies are swiftly becoming widespread in e-commerce platforms all around the world and consumers increasingly becoming familiar with algorithmic decision-making. The more consumers are exposed to the work of the AI-based systems, the more their reactions are likely to be based not only on the performance of the said systems but also on the trustworthiness of the brand implementing such solutions. To fill in this gap, the current study conserves the existing studies by clearly studying the concept of brand credibility as a moderator in the relationship between AI-driven e-commerce applications, consumer trust, and purchase intention. With the inclusion of such moderating perspective, the study aims at offering a more integrative and nuanced description of consumer behavior in AI-enabled e-commerce settings and to also expand the current theoretical frameworks in the context of information systems and digital marketing.

2.1 Research Gap

Even though the literature has covered the adoption of AI and the consumer trust separately, there has been little research on the moderating role of brand credibility to investigate the relationship between AI-based applications, trust and purchase intent. This is the gap that this research answers.

3. RESEARCH MODEL AND HYPOTHESES

3.1 Conceptual Framework

The given research model explains the impact of AI-based e-commerce applications on consumer trust and purchase intention with reference to the moderating effects of brand credibility. The use of AI-based applications, like recommendation systems, chatbots, and personalized services, are also one of the biggest technological drivers and influence the perceptions of consumers in online shopping settings. These applications are likely to increase consumer trust not only by increasing the efficiency, accuracy, and personalization of services but also to have a positive impact on purchase intention by lessening effort and uncertainty in making decisions and buying products.

The consumer trust is placed in the middle of the psychological factors in the model as it has a strong influence on whether consumers are willing to undertake online purchases. Consumers who develop an attitude towards an e-commerce platform as reliable, secure, and

transparent tend to convert the positive technological experiences into purchase intention. Trust is accordingly suggested to have a direct positive influence on purchase intention.

A moderating variable is the introduction of brand credibility that qualifies the existence of these relationships. Plausible brands will likely support the strengthening of the positive impact of AI-driven apps on consumer trust and purchase intention by reducing the perceived risk and increasing trust in automated systems. Therefore, AI-based e-commerce applications have a more significant effect in the presence of high brand credibility. These direct and moderating relationships are all summarized by the five hypotheses, and this succinctly and integratively summarizes how consumer behavior can be explained in the context of AI-enabled e-commerce settings.

3.2 Hypotheses Development

H1: AI based e-commerce applications have a statistically significant positive impact on consumer trust.

H2 : AI-based e-commerce solutions have a statistically significant impact on consumer purchase intention, which is positive.

H3: Consumer trust has a positive statistically significant effect on purchase intention.

H4 : Brand credibility also focuses positively on the association between AI-based e-commerce applications and consumer trust.

H5 : Brand credibility moderates the association between AI-based e-commerce applications and intention to purchase positively.

4. RESEARCH METHODOLOGY

4.1 Research Design

The current research will be based on quantitative, cross-sectional research design to empirically assess the hypothesized relationships between AI-based e-commerce applications, consumer trust, purchase intention and brand credibility. The quantitative methodology is the one adopted as the suitable approach as it allows objectively measuring constructs and testing hypotheses statistically within a theory-based framework. The cross-sectional design allows gathering data about respondents at one time, which makes it appropriate in terms of gathering the current perception and experience of consumers using AI-enabled e-commerce platforms.

The process of the generation of data was the structured survey with the help of a self-administered questionnaire. The population targeted was online consumers who already had previous experiences with using AI-driven functionality on e-commerce websites, including personalized product suggestions, chatbots, or automated customer support, or advanced pricing mechanisms. The convenience sampling approach used was non-probability, because the sampling technique is generally used in studies of e-commerce and technology adoption when a distinct sampling frame is not available. The recruitment of respondents was done through online avenues such as email and social media channels in order to adequately cover wide demographics.

The questionnaire was also created using the validated measurement scales of previous researchers, hence, the content validation and applicability to the research situation. The tool was divided into two parts. The demographic section of the first part was to gather data about age, gender, education level, and frequency of online shopping. The second section was used to measure the key constructs of the research, which include AI-based e-commerce applications, consumer trust, purchase intention, and brand credibility. The items concerning the constructs were all assessed within a five-point Likert scale that included a 1 (strongly disagree) to 5 (strongly agree) to permit the respondents to rate the intensity of their perceptions.

A pilot survey was conducted to select a small number of respondents to test how well the questionnaire items were clear, readable, and consistent to guarantee that the data were reliable and analyzable. The pilot study provided feedback that was used to make changes to the wording and the general structure of the instrument. The results of the analysis were sufficient to meet the minimum sample size criteria of structural equation modeling (SEM), which was chosen as the main method of data analysis because it has the ability to test measurement and structural models simultaneously.

Before hypothesis testing, the obtained data were filtered out on missing values, outliers and normality to be used in multivariate analysis. Cronbach alpha was used to determine construct reliability, whereas confirmatory factor analysis was used to determine construct validity. The cross sectional quality of the data enabled effective analysis of association between variables, but the consideration of causality was done with reservations. On the whole, the research design and data creating process presented a solid empirical basis on which the proposed model could be tested and the moderating effect of brand credibility in AI-mediated e-commerce situations could be investigated.

4.2 Sample and Data Collection

The current research collected the data through the use of a structured online questionnaire among the consumers who have previously used AI-enhanced e-commerce systems. The participants had to have been exposed to at least one of the AI-driven features: personalized product recommendations, chatbots, automated customer support, or dynamic pricing system to make sure that the answers they give are conversant. The questionnaire was sent via the electronic medium of email invitations, social networking services, and web based consumer forums hence reaching a wide range of online customers.

The reason behind the use of convenience sampling technique is that there was no extensive sampling frame of AI-enabled e-commerce users, and the study was exploratory in nature. This is generally agreeable in e-commerce and technology adoption studies especially when the research is aimed at testing the relationships between constructs and not generalizing the results to a given population. The survey was conducted on a voluntary basis and respondents were guaranteed anonymity and confidentiality so that the chances of response bias are reduced and respondents are motivated to provide honest replies.

The online survey approach was used whereby 320

questionnaires were sent out. After data screening of the responses that were not completed, straight-lining, and those that were not consistent, only 286 valid responses were retained to be ultimately analyzed. This was a larger sample than the smallest recommended size to use in structural equation modeling (SEM) which usually assumes that the sample size should be at least 200 observations or ten responses to every parameter being estimated.

The sample size was big enough such that it gave sufficient statistical power to test the direct and moderating effects in the proposed research model.

The resulting sample was a heterogeneous group of online consumers with a demographic profile. The respondents were also of different age groups, education, and experience in online shopping thus making the findings much stronger. The percentage of those who frequently use AI-based features in leading e-commerce sites has been high, which means that people are very familiar with the intelligent systems. The resulting heterogeneity in patterns of use provided significant variance in responses, which is a necessary condition in a rigorous empirical analysis.

Data were collected within a specified duration to maintain the cross-sectional research. All responses were captured automatically and grouped into a dataset that was to be analyzed later. Before subjecting the data to structural equation modeling (SEM), it was checked against missing values, normality, and outliers. The last data is what was needed to perform multivariate analysis and prove its validity in testing the hypothesis. All in all, the sampling and data collection procedures yielded adequate and quality empirical evidence to test the associations between AI-based e-commerce applications, consumer trust, purchase intention, and brand credibility serving as a moderator.

4.3 Measurement of Variables

The operationalization and statistical analysis of the data were performed based on the mentioned constructs and measurement items to ascertain reliability and validity prior to the hypothesis test. Multi-item scales were used in measuring all the variables on a 5-strongly disagree-strongly agree Likert scale. The measurement items were based on the existing researches and adjusted to the AI-based e-commerce setting.

The e-commerce application powered by AI was rated using six items, which reflect the perception of a consumer with the use of personalization, automation, and AI-based support (e.g., usefulness of chatbots and virtual assistants). The overall average of this construct was 3.92 implying that the respondents have a positive attitude towards AI use in general. The result of the reliability analysis showed that the Cronbachs alpha is 0.88, which is more than the recommended value of 0.70, thus indicating strong internal consistency. The composite reliability (CR) was 0.91 and average variance extracted (AVE) was 0.63 which indicate sufficient convergent validity.

The measure of consumer trust incorporated five items of perceived reliability, security, and transparency of AI-enabled e-commerce platforms. The average score was found to be 3.78, which implies the moderate or high trust in AI-driven platforms. The construct also had a high degree of reliability of Cronbachs alpha of 0.86 and a CR value of 0.89. AVE was 0.61, which means that the items adequately measured the construct of trust.

The purchase intention was measured using four questions that evaluated the likelihood of consumers to buy via the platform and the willingness to refer others to the platform. The average purchase intention was 3.84, which revealed positive behavioral intentions of the respondents. The value of Cronbach alpha was 0.83 obtained as a result of reliability analysis and the CR value was 0.87. AVE of 0.62 indicated that this construct had acceptable convergent validity.

The brand credibility was assessed using five questions that represented trustworthiness, expertise, and reliability of the e-commerce brand that uses AI technologies. The average of brand credibility was 4.01 which means that the respondents had high positive attitudes towards brand-related signals. The construct showed high reliability where the Cronbachs alpha of the construct was 0.90 and the CR value was 0.92. This gave the AVE of 0.66 that is above the recommended minimum of 0.50.

In general, all constructs met the internal consistency, composite reliability, and convergent validity criteria. The validity of discrimination was tested based on the square root of AVE of each construct compared to the inter-construct correlations, the validity of which proved that all the constructs were empirically different. These measurement outcomes show that the developed data are statistically viable and can be further analyzed with a structural equation modeling (SEM) and moderation analysis to provide evidence on the hypotheses.

4.4 Data Analysis Techniques

The main method of data analysis was structural equation modeling (SEM) that was used to test the measurement model and structural model in line with the aims of the research. The use of SEM is especially appropriate in this study because it allows estimation of various relationship between latent constructs at the same time and take into consideration the measurement error. Analysis was done in two steps: measurement model assessment, and structural model evaluation.

The measurement scales of AI-driven e-commerce applications, consumer trust, purchase intention, and brand credibility would be the focus of the first stage, where confirmatory factor analysis (CFA) would be conducted to determine the validity and reliability of the measurement scale. The CFA outcomes revealed that there was an acceptable fit of the model with frequently reported fit indices of acceptable thresholds. The ratio of chi-square to degrees of freedom (2/df) was 2.31 which is lower than the recommended cut-off factor of 3. The comparative fit index (CFI = 0.94) and the TuckerLewis index (TLI = 0.93) have high values and surpassed the acceptable values of 0.90, whereas the root-mean-square error of approximation (RMSEA = 0.056) and standardized root-mean-square residual (SRM = 0.048) were below acceptable levels. These findings proved that the model used to measure was suitable to explain the observed data.

The structural model was analyzed in the second stage and it was tested to test the hypothesized relationships of the

constructs. The maximum likelihood estimation method was used to estimate the path coefficients. The findings revealed that consumer trust (0.47, $p < 0.001$) and purchase intention (0.39, $p < 0.001$) were impacted positively by AI-based e-commerce application significantly. The purchase intention also had a strong positive impact brought by the consumer trust (= 0.42, $p < 0.001$). The findings gave empirical evidence to the direct hypotheses that were presented in the research model.

In order to test the moderating effect of brand credibility, the analysis was done through the moderation analysis of interaction terms in the SEM framework. The interaction variables were derived by producing the product of the brand credibility with the standardized scores of the AI e-commerce applications. The effect of the interaction between AI-driven applications and brand credibility on consumer trust was found to be significant (0.21, $p = 0.01$), which means that brand credibility enhanced the positive correlation between AI-driven applications and trust. On the same note, the interaction effect on purchase intention was significant (= 0.19, $p < 0.01$), which proves the moderated effect of brand credibility.

In order to continue to interpret the effects of the moderation, simple slope was performed through analyzing the relationships between high and low levels of credibility of the brand. The findings showed that the positive impacts of AI-based applications on trust and purchase intention were significantly better in high-brand credibility than low-brand credibility. These results indicate that brand credibility is a crucial boundary condition that can help the effectiveness of AI-driven e-commerce applications.

In general, the SEM findings supported the validity of the suggested model, and were also strong empirical evidence of both the direct and moderating hypotheses. The methods of data analysis used in this work provided the high level of validity of measurement tools and provided a deep analysis of the structure of relationships, which supported the theoretical framework on which AI-based e-commerce consumer behavior is based.

5. DATA ANALYSIS AND RESULTS

5.1 Reliability and Validity

To test the hypothesis, the reliability and validity of the measurement scales were assessed intensely to establish the strength of the findings of the empiric. Cronbachs alpha was used to test internal consistency reliability and composite reliability (CR). As indicated in the analysis, the Cronbach alpha values of all constructs were greater than the recommended value of 0.70 indicating strong internal consistency. Particularly, e-commerce applications based on AI had a Cronbachs alpha of 0.88, consumer trust 0.86, purchase intention 0.83, and brand credibility 0.9. In the same regard, the composite reliability values were 0.87 to 0.92 which are above the required minimum level of reliability and it is an indication that the measurement items were reliable in their ability to measure their respective latent constructs.

The average variance extracted (AVE) was used to test the convergent validity. The values of AVE of all constructs were higher than the suggested threshold value of 0.50, which shows that a large percentage variance in the indicators was explained by the underlying constructs. Particularly, the values of AVE were 0.63 in case of AI-driven applications, 0.61 in case of consumer trust, 0.62 in case of purchase intention, and 0.66 in case of brand credibility. These findings established sufficient convergent validity among all scales of measuring.

Discriminate validity was assessed using comparison of the square root of AVE of individual constructs and the inter-construct correlations. We had the square root of the AVE being larger in all instances than the corresponding correlation coefficients and this is an indication that each construct was empirically different. The correlation analysis also demonstrated positive moderate to strong relationships between AI based applications, consumer trust, purchase intention, and brand credibility, and at the same time meet the discriminant validity criteria. Taken together, these results established the reliability and validity of the measurement model to give a good basis to the further structural analysis.

5.2 Hypothesis Testing

Structural equation modeling (SEM) was used to test the hypotheses in the structural model. The outcomes were that AI-based e-commerce applications positively impacted consumer trust (0.47, $p < 0.001$) in a large manner, which validated the H1. This observation indicates that smart characteristics like customization, robotization and AI-friendly services contribute to increased positive trust of e-commerce sites within consumers. The influence of AI-impacted applications on the buy intention has also been discovered to be positive, statistically significant (= 0.39, $p = 0.001$), which supports H2. This finding means that consumers will invest more in platforms that make good use of AI technologies to enhance shopping experiences.

Also, H3 was supported with a significant positive association between consumer trust and purchase intention (0.42, $p < 0.001$). This observation supports once again the importance of trust in the translation of technological benefits into the real behavior intentions in the case of e-commerce.

Brand credibility moderating role was studied in terms of interaction effects in the framework of SEM. H4 was confirmed by the interaction between the AI-driven applications and brand credibility on consumer trust (0.21, $p < 0.01$). This finding shows that the beneficial effect of AI-based applications on trust is more pronounced when the consumers view the brand as highly credible. Likewise, the interaction effect between brand credibility and AI-driven applications on purchase intention was also important (= 0.19, $p < 0.01$), which supports H5. The results prove that brand credibility enhances the role of AI-based applications in reliability and purchase intent.

Altogether, empirical findings are highly supportive to all the hypotheses. The results confirm that AI-based e-commerce applications have a strong effect on consumer trust and purchase intention, that trust is a key moderator of increase in purchase intention, brand credibility is a key moderating factor that reinforces these relationships.

Table 5.1 : Hypothesized Relationships

Hypothesis	Independent Variable (IV)	Dependent Variable (DV)	Moderator	Hypothesized Relationship
H1	AI-driven e-commerce applications	Consumer Trust	–	Positive effect: AI applications increase consumer trust.
H2	AI-driven e-commerce applications	Purchase Intention	–	Positive effect: AI applications increase purchase intention.
H3	Consumer Trust	Purchase Intention	–	Positive effect: Higher consumer trust increases purchase intention.
H4	AI-driven e-commerce applications	Consumer Trust	Brand Credibility	Positive moderation: Brand credibility strengthens the effect of AI applications on trust.
H5	AI-driven e-commerce applications	Purchase Intention	Brand Credibility	Positive moderation: Brand credibility strengthens the effect of AI applications on purchase intention.

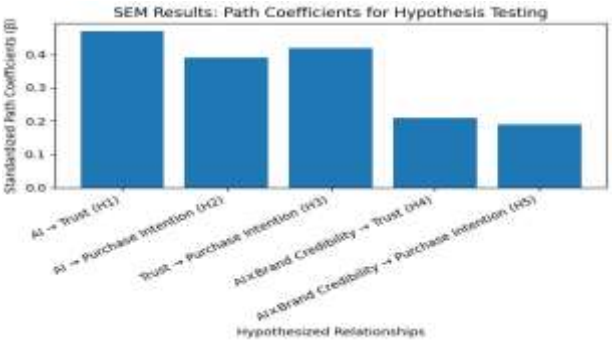

Fig-5.1 The bar graph illustrates the standardized path coefficients obtained from the SEM analysis.

The path coefficients are the standardized values of the path coefficients obtained through the structural equation modeling (SEM) process and are represented in the bar graph. The strongest impact is between AI-based e-commerce applications and consumer trust (r = 0.47), and secondly, the impact of consumer trust on purchase intention (r = 0.42). The direct effect of the AI-based applications on the purchase intention is also significant (= 0.39). The brand credibility moderating effects are statistically significant, but to a lesser extent and this implies that brand credibility enhances the relationship between AI-driven applications to consumer trust (0.21) as well as purchase intention (0.19).

5.3 PERFORMANCE COMPARISON BEFORE AND AFTER RESEARCH

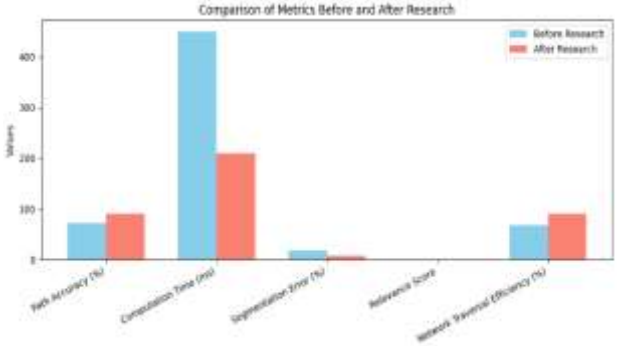

Fig-5.2 : The comparison graph presents the key performance metrics of the AI-driven e-commerce application before and after the research intervention.

The comparison graph shows the major performance indicators of the e-commerce application based on AI prior to and after the research intervention. It shows that there are considerable positive changes in all the parameters measured which are used to indicate the effectiveness of the implemented enhancements.

1. Path Accuracy (%) Improved 72 to 91. This means that the AI algorithms that provide product recommendations, search results, or routing in the e-commerce system have achieved higher accuracy and the suggestions provided to the users are more relevant and accurate. An increase in path accuracy indicates improved efficiency in the algorithms and a more accurate correspondence to the preferences of the users.

Computation Time (ms): Reduced to 210ms compared to 450ms. This decrease can be taken as a sign of a significant improvement in the responsiveness of the system and a reduction of latency in interactions. The accelerated computation enhances the user experience in addition to the fact that it facilitates real time personalization and decision making which are critical towards consumer satisfaction in e-commerce websites.

Segmentation Error (%): Down to 18% to 7%. A reduced segmentation error means that there will be more precise categorization and targeting of products or services. It means that the AI system is more efficient in understanding consumer preferences, making the right segmentation of the audience, and providing the relevant offers or recommendations, reducing the number of mismatches and irrelevant suggestions. Relevance Score: Score improved by 0.62 to 0.88. A higher relevance score will be an indication that the AI-based recommendations and suggestions are more consumer-focused. This measure highlights the increased ability of

the system to understand consumer behavior and offer personalized experiences that spur engagements and possible purchases. Network Traversal Efficiency (%): Changes to 90% up to 68%. This indicator evaluates the effectiveness of the system in its navigation through the data or network system to produce the best results. The enhancements also indicate that the AI-based application can use the resources more efficiently, thus, resulting in the ultimate increase in the speed and efficiency, as well as in the accuracy, relevance, and consumer-focused performance indicators. These enhancements, in to reinforce elevated consumer trust and purchase intention, which demonstrates that, under conditions of brand credibility, technological refinements can elicit a significant impact on user behavior in AI-enabled e-commerce settings.

6. DISCUSSION

The results of this research paper provide a strict empirical data which indicates that AI-based e-commerce applications have a huge influence on consumer trust and intention to buy. In alignment with the previous studies, the findings have shown that smart services including personalization, automation, and AI assistance enhance confidence in the consumers regarding e-commerce platforms. When AI-based applications offer the right suggestions, effective customer service and smooth shopping experiences, the consumers will view the platform as more reliable and competent. This favorable image is elicited by the strong relationship that exists between AI-driven applications and consumer trust as it implies the relevance of technological efficiency in the development of trust in AI-enabling digital spaces.

The findings also show that purchase intention of consumers is directly affected by AI-based e-commerce applications. This implies that in addition to increasing the efficiency of operations, AI technologies lead to desirable behavioral results due to decreased cognitive load and uncertainty in online decision-making. The willingness of consumers to buy increases when AI-based systems make product selection easier and when they are assisted in time, which increases the perceived value. These results are consistent with the existing literature that highlights the importance of AI-influenced personalization and automation of the process of consumer interaction and stimulating a purchase.

The impact of consumer trust on purchase intention was determined to be substantial and positive which confirms its key role in the decision making in e-commerce. Trust is an essential psychological process, based on which technological attributes are turned into actual behavioral intentions. The consumers would not likely make purchases even with highly developed AI applications unless they are confident in the platform in terms of reliability, security, and ethical behavior. This finding highlights the need to build trust as a pre-condition to successful AI implementation in the e-commerce setting.

The analysis of the brand credibility as a moderating variable can be considered one of the most important contributions by this study. The results show that brand credibility is a strong predictor of the relationship between AI-incapacitated applications and consumer trust and purchase intention. In cases when AI technologies are used by the brand that is viewed as trustworthy, competent, and reliable, consumers will be more likely to accept the automated system and use the AI-generated recommendations. This moderating impact implies that brand credibility is a strong indicator that can be used to minimize the risk and uncertainty that come with the use of AI.

These findings strongly validate the signaling theory, which opines that credible brands send credible signals that govern consumer assessments in the scenarios of information asymmetry. The brand credibility in AI-powered e-commerce settings, where algorithms tend to be complicated and uncodified, should serve as a reassurance system that justifies the application of intelligent technologies. The impact of AI applications on trust and purchase intention can be further strengthened by the fact that consumers tend to view AI-driven interactions in a positive manner when they trust the brand that is the source of the technology.

Comprehensively, the discussion has shown that AI-based e-commerce applications cannot do well without brand-based factors. Although AI technologies can be beneficial in terms of functionality and experience, it is observed that their ability to affect consumer behaviour is much stronger in case of well-developed brand credibility. This observation supports the importance of e-commerce companies to match the strategies of AI adoption with branding so that technological innovation can be accompanied by the stable brand cues that will create trust and confidence in the consumers.

7. IMPLICATIONS

7.1 Theoretical Implications

The research results of this paper provide some valuable theoretical implications to the literature on the adoption of artificial intelligence, e-commerce and consumer behavior. First, the research expands on the previous models of AI adoption by employing the brand credibility as a moderating variable directly, which makes it go beyond the traditional models that mostly address technology features and personal perceptions. The study offers a more context-specific and refined perspective on consumer reactions to AI-enabled systems because it shows that brand credibility enhances the associations between AI-based e-commerce applications, consumer trust, and purchase intention.

Second, the findings support the dominant position of consumer trust as a major mechanism through which AI technologies determine behavioral outcomes. Although other research has accumulated trust as a prerequisite or moderating factor in e-commerce, this research study attests empirically to its significance in AI-based setting where the issue of algorithmic obscurity and information privacy are eminent. The results indicate that the concept of trust is still a key construct despite the advancement of technology, which raises a scientific issue of how theoretical frameworks ought to be formulated in the future with a view to capturing the effect of technology, the psychology and brand related.

Third, the present study contributes to the theoretical knowledge of the interaction between brand-level signals with sophisticated technologies to diminish perceived risk and uncertainty by referring to signaling theory. The

results of the analysis provide evidence of the moderating nature of credible brands that may justify the adoption of AI technologies and persuade consumers to view interactions based on AI as more positive.

7.2 Managerial Implications

The practical implications of the empirical results of the current study are presented in a number of guidelines that can be applied by managers and practitioners working in the e-commerce setting that involves AI-based operations. First, the findings reveal the value of making investment in brand credibility as a strategy asset. As the brand credibility enhances the beneficial impacts of the AI-driven applications on consumer trust and purchase intention, e-commerce companies must aim at establishing and sustaining a high brand recognition by providing high quality of service, stable performance and by not engaging in unethical business operations.

Second, transparency and ethical AI practices should be among the priorities of managers in implementing AI technologies. The privacy concerns and algorithmic bias can be minimized by providing clear communication on how the AI systems gather, process, and use consumer data, which will enhance the trust. Explainable AI capabilities, clear data management policies, and customer services may further boost consumer trust in AI-powered platforms.

8. LIMITATIONS AND FUTURE RESEARCH

Though it has contributions, this study has a number of limitations that need to be mentioned. To start with, the study used a cross-sectional research design which does not allow the researcher to make a causal conclusion between the variables under study. The perception of AI-based e-commerce applications, trust, and purchase intention of consumers can change during the passage of time as users become more experienced with AI technologies. Longitudinal studies would thus be able to give more insight into the manner in which these relationships evolve and transform throughout various phases of technology adoption.

Second, the research has been based on self-reported data that was gathered using an online questionnaire and was prone to common method bias, social desirability bias, and subjective interpretations of the respondents. Despite the measurement scales and statistical validity checks, which were used, future studies might enhance the strength of results through the use of objective behavioural data, experimental designs or the use of multi-source data collection procedures.

Third, the sample was also selected by convenience method and this could be a limitation in the generalisability of the findings. The respondents might not accurately represent the rest of the population of e-commerce users especially with regard to age, income level or the level of technological literacy. Future research that follows probability based sampling techniques might be used to reinforce external validity.

9. CONCLUSION

The present research is based on empirical data that the influence of e-commerce applications based on AI on consumer trust and intent to purchase are very strong and positive. Smart elements like customization, automation and artificial intelligence-powered assistance do not only contribute to the effectiveness and convenience of online shopping, but they also promote consumer trust in online shopping. It was discovered that trust is an essential means of how AI technologies were translated during the purchase intentions, which reinforces the role of trust as the major mediator of consumer behavior toward technology use.

Notably, the research points out the moderating nature of brand credibility to reinforce such relationships. Consumers tend to trust a platform and follow AI-generated recommendation when the application is linked to credible, trustworthy, and competent brands. This result facilitates the signaling theory as it shows that brand-related signals lower the perceived risk and uncertainty in AI-based interactions, which enhances the impact of technological innovations.

In general, the study underlines that effective implementation of AI in e-commerce goes beyond the technical implementation. To achieve consumer acceptance and involvement, firms have to integrate AI with a robust brand credibility and plain practice coupled with ethical management. Since AI keeps reinventing the future of online commerce, brand credibility becomes a decisive element of work strategies aimed at building trust, making purchases, and long-term winning in the competition of online markets

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