# AN APPRAISAL ON IMPACT OF ARTIFICIAL INTELLIGENCE DRIVEN ALGORITHMS (AUTO-SUGGESTIONS) IN DETERMINING CONSUMER'S BUYING BEHAVIOR ACROSS E-COMMERCE PLATFORMS

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## ABSTRACT

*Artificial intelligence seems to override the human decision making. The AI, IOT, ML and algo driven customization and auto suggestions across the e-commerce platforms seem to guide online shopper with regard to product and brand choice. The susceptibility of customer's decision making to algo guidance is more extensive in view of reach of the android and apple based smartphones. The studies on subject matter regard this both as a threat and as an opportunity. The established TAM, technology readiness, TPM and other theoretical frameworks reflect on the aspects that shape the behavioral attributes in human decision making. The research hence seeks to classify and establish the relationships across the factors that seem to determine the customer's mindsets, locus of control and decide susceptibility to technology driven marketization. The study intends to leverage the likert scales and seeks to refine the data with extractive factor analysis to reach conclusions.*

**KeyWords:** Consumer's Purchase Behavior, Auto-Suggestions, Artificial Intelligence Driven Algorithms, E-Commerce Platforms, SEM, India.

## INTRODUCTION

Technology has opened up unlimited wealth creation opportunities. The manner of customer-marketer interaction has undergone sea change with strategic and selective incorporation of the technology in shaping and influencing consumption habits and activities. The earlier notions of physical interaction between customer and marketer have now been taken over by physical and digital interfaces across a plethora of devices and means that shape the human propensity to consume in multiple ways and means. The recent advances in technology absorption and embedment in customer-marketer dynamics foresees the extensive usage of artificial driven apps, programs and interfaces that equip, shape and influence customer decision making in manifold ways (Li, Zhong, Zhang, & Zhao, 2022). The auto suggestions by the algorithm and the likewise computer programs over the mobile, android enabled and other virtual platforms possess implications for customer behavior. In this perspective, Indian approaches and strategies by Indian marketers across a number of industries involving extensive customer involvement; are not lacking behind. The problem that led to massive technology incorporation



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was the call for contactless, digital and paperless contact promotion in the era of pandemic and post pandemic turbulence and uncertainty (Bawack, Wamba, & Carillo, 2022). A lot of studies (Kopalle, Gangwar, Kaplan, & Ramachandran, 2022) point to the shift in the customer buying tactics and habits as modulated by the pandemic. The limitation of pandemic in other words opened up new ways and means to reach out to the customer.

## Understanding the Shift

The shift is tremendous as the technology is interfering extensively with human agenda, decision making and choice making perspective. The algorithms (Stinson, 2022) which are widely believed to facilitate the ultimate customer decision making. The change in focus from internal locus to external algorithm driven impetus has changed the manner and pattern of decision making at the customer end extensively. Indian customer's purchase behavior across e-commerce platforms.

## Why this Research

Artificial intelligence (Khrais, 2020) seems to override the human decision making. Artificial intelligence driven platforms, applications and in-app approaches are revolutionizing the way the commerce is being undertaken. The AI, IOT, ML and algo driven customization and auto suggestions across the e-commerce platforms seem to guide online shopper with regard to product and brand choice. The susceptibility of customer's decision making (Schiessl, Dias, & Korelo, 2022) to algo guidance is more extensive in view of reach of the android and apple based smartphones. The studies on subject matter regard this both as a threat and as an opportunity. The established TAM, technology readiness, TPM and other theoretical frameworks reflect on the aspects that shape the behavioral attributes in human decision making. The research hence seeks to classify and establish the relationships across the factors that seem to determine the customer's mindsets, locus of control and decide susceptibility to technology driven marketization. The research hence ascertains the impact of AI based voice assistant services, AI based chat services and AI based calculation and choice making on the customer decision making in modern technology intensive marketing environments. The research first explores the literature on subject and then develops the research construct with aid of likert scales. The research subsequently applies factor analysis and structural equation modeling to ascertain the linkages in sections below.

## Objective

To ascertain the role of AI based voice assistant services, AI based chat services and AI based calculation and choice making on the customer decision making in modern technology intensive marketing environments.

# LITERATURE AND HYPOTHESIS

The susceptibility of customer's decision making to algo guidance is more extensive in view of reach of the android and apple based smartphones. The studies on subject matter regard this both as a threat and as an opportunity. The established TAM, technology readiness, TPM and other theoretical frameworks reflect on the aspects that shape the behavioral attributes in human decision making (Dehnert & Schumann, 2022).



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## AI based Voice Assistant Services

A plethora of research studies (Nica, Sabie, Mascu, & Lutan, 2022) collectively point to larger than expected role of AI based voice assistant services in altering and re shaping the customer impetus and control and choice of options. Especially in aftermath of pandemic induced contactless and digital interfaces (Mele & Spena, 2022), auto suggestions from the apps and applications have become a common aspect of marketer-customer communications. The theoretical frameworks speak about the increased and sustained use of Alexa like platforms and devices in guiding customer decision making as well. A research (Xiaw, Tan, Cham, & Raman, 2022) across 411 respondents revealed the significant impact of para social interactions, smart-shopping perceptions and AI enabled customer experience on the shaping od customer aspirations. The research delved on the aspects of human like technology attributes as influencing the customer based outcomes with regard to product being on sale. Another research (Marikyan, Papagiannidis, Rana, Ranjan, & Morgan, 2022) observed the incidence of Alexa as shaping the productivity, choice making on the shopping list and general search of information and knowledge (Akram, Diwedi, Shareef, & Bhatti, 2022). The studies have reported extensive role of AI based voice assistant services in transforming customer experience with digital voice assistants. Hence we propose the hypothesis as following:

***$H_1$:*** *There is significant impact of AI based voice assistant services on customer decision making*

## AI based Chat Services

The literature (Silva, Shojaei, & Barbosa, 2023) reports statistically significant impact of AI based chat services on the formation of customer aspirations and purchase intent. The study across 201 Portuguese chatbot users revealed the incidence of chatbot based services as influencing the customer's shopping intent and indulgence capacity in the purchase perspective. The study further delved on the aspects of user satisfaction and other elements from technology acceptance model. Another research (Vassilakopoulou, Haug, Salvesan, & Pappas, 2023) pointed to incidence of significant differences being formulated in public service delivery with aid of chatbots. The research literature (Li, Zhong, Zhang, & Zhao, 2022) points to the prevalence of chatbot derived impact on the customer decision making with active tapping of human intelligence and choice making restrictions with active engagement with customer in focus. Hence the study proposes next research hypothesis as under:

***$H_2$:*** *There is significant impact of AI based chat services on customer decision making*.

## AI based Calculation and Choice Making

The artificial intelligence driven calculations (Dehnert & Schumann, 2022), support to numeric and analytic decision making, AI assisted calculations (Dehnert & Schumann, 2022) also seem to exert extensive impact on customer choice making in all low and high involvement industries. The AI based support in numeric calculations (Vassilakopoulou, Haug, Salvesan, & Pappas, 2023), AI based calculation seems to possess marked impact on customer choice making as well as on the customer decision making in modern technology intensive marketing environments (Mele & Spena, 2022). Hence the third research hypothesis is being devised as under:



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***$H_3$:*** *There is significant impact of AI based calculation and choice making on customer decision making*

## Methodology

The review of existing literature (Bogert, Schecter, & Watson, 2021) also points towards the prevalence of uni-dimensional and multidimensional as well as formative and reflective measures of AI based voice assistant services, AI based chat services and AI based calculation and choice making and customer decision making. The research constructs were operationalized with aid of 1-5 point likert scaling instruments. The sample frame comprises the working from home individual in age group 20 to 25. The study is based on the perceptions of the individual who were working from home with aid of laptops, desktops or other similar digital assets. Secondly these individual must have a daily work count of more than five hours. Further the sample frame comprises the youngster working from home that operate in any of the pre decided sectors or the clusters spread across modern India. Various criteria were used to segregate the most suitable for the research study. The study relied on random sampling and attracted a valid sample size of 270 respondents. The extractive factor analysis methodology comprising KMO Test (For data Adequacy), EFA (For extraction of loading variables or sub scale items and reduction of data), Reliability Assessment with Cronbach Alpha, Correlation Assessment were leveraged. The study leveraged the IBM software SPSS version release 24.0 for the conduct of empirical calculations, validity assessment and reliability exploration. The factor structure was examined with aid of factor analysis and subsequent tests like variance examination, Scree plot analysis and pattern matrix determination. The study leveraged the factor analysis methodology as a tool for exploring the representing dimensions of the factors assumed for the analysis. The extractive factor analysis facilitates the evaluation of the dimensions as well as leads to dimensional validity assessment with regard to data as collected from the Likert based scales. The research based data collection was undertaken with aid of specified likert scale and subsequently was analyzed with aid of statistical tools like exploratory and confirmatory factor analysis across SPSS and AMOS statistical software. The comprehensive data analysis was accomplished with use of SPSS version release 24.0. The validity and reliability assessment of the respondent's data was established with variance analysis and cronbach alpha measurement. Further SEM modeling was incorporated to establish the causal path based linkages across the chosen factors.

## Analysis

The reliability assessment is critical for repetitive nature of the outcomes and acceptance of the results across the application of the same measurement instrument. As per the existing literature on the subject, the reliability assessment is an absolute measure of the precision of the responses and the effectiveness of the measurement instrument. The studies on the subject also identify the reliability as associated with the reproducibility of the results or the test scores in consistent manner. The respective KMO measure was observed in satisfactory range of 0.5 to 0.00, which signifies factorability and data adequacy. The satisfactory range for the communality has been identified across 0.5 to 0.99.The variance assessment was carried out in order to ascertain the factor wide weightage accorded by the respondents. The communalities assessment reveals the extent of variance that is exhibited by each sub scale item. The retained sub scale items with regard to each factor essentially have value in range of 0.5 to 0.99 or simply greater



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than 0.5. The respective communality assessment pointed to satisfactory achievement of data factorability Tables 1 & 2.

**Table 1**
**KMO AND BARTLETT'S TEST**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.884 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 3898.737 |
| | df | 136 |
| | Sig. | 0.000 |

**Table 2**
**COMMUNALITIES**

| | Initial | Extraction |
|---|---|---|
| VO1 | 1.000 | 0.715 |
| VO2 | 1.000 | 0.791 |
| VO3 | 1.000 | 0.745 |
| VO5 | 1.000 | 0.763 |
| CB1 | 1.000 | 0.753 |
| CB2 | 1.000 | 0.702 |
| CB4 | 1.000 | 0.738 |
| CB5 | 1.000 | 0.717 |
| CM2 | 1.000 | 0.736 |
| CM3 | 1.000 | 0.745 |
| CM4 | 1.000 | 0.721 |
| CM5 | 1.000 | 0.723 |
| CD1 | 1.000 | 0.603 |
| CD2 | 1.000 | 0.688 |
| CD3 | 1.000 | 0.683 |
| CD4 | 1.000 | 0.629 |
| CD6 | 1.000 | .601 |

Extraction Method: Principal Component Analysis.

The factor extraction formed the next crucial stage. This is essential to ascertain the factor weightage that each factor occupies across scale composition. This enables the research in



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comprehending the variance that is exhibited by each scale constituent. As observed, the factor *"customer decision making*" experienced maximum possible variance and weightage in line with studies on subject matter Table 3.

**Table 3**
**TOTAL VARIANCE EXPLAINED**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1=Customer Decision making | 5.872 | 34.542 | 34.542 | 5.872 | 34.542 | 34.542 | 3.229 | 18.993 | 18.993 |
| 2=Voice Assistance | 2.501 | 14.710 | 49.253 | 2.501 | 14.710 | 49.253 | 2.970 | 17.473 | 36.467 |
| 3=Calculation Assistance | 1.913 | 11.250 | 60.503 | 1.913 | 11.250 | 60.503 | 2.949 | 17.350 | 53.816 |
| 4=Chatbot Assistance | 1.520 | 9.247 | 72.370 | 1.520 | 9.247 | 72.370 | 2.892 | 17.248 | 58.692 |
| Extraction Method: Principal Component Analysis. | | | | | | | | | |

The "*variance examination*" as mentioned in sections above, established the factor wide variations as observed across the Scree plot (mentioned in sections below). As per existing literature, the traditional Scree plot illustrates the Eigen values on the y-axis and the number of factors on the x-axis respectively. The scree plot captures the total number of factors to be considered for further analysis. The downward curve slopes to right and number of factors considered are to be classified from the slope till elbow point. The first factor "customer decision making" illustrated the maximum observed variance of 34.542 per cent collectively Figure 1.

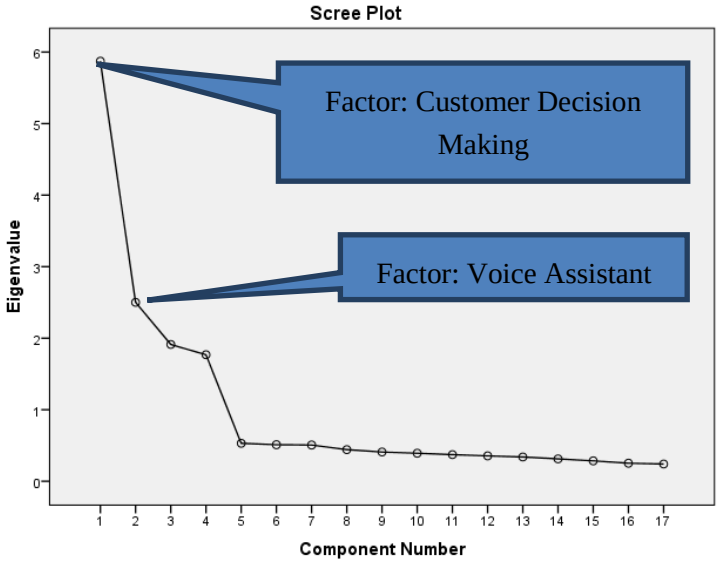


**FIGURE 1**
**SCREE PLOT OF VARIATIONS**

The dimensional validity assessment is vital as all the considered sub scale dimensions may or may not load or represent the factor comprehensively. In order to separate the representing (loading) and non-representing (non-loading) dimensions, the principal component analysis with varimax rotation was applied across SPSS platform (Table 4).



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**Table 4**
**ROTATED COMPONENT MATRIX[A]**

| | Component | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| VO1 | | .802 | | |
| VO2 | | .831 | | |
| VO3 | | .849 | | |
| VO5 | | .827 | | |
| CB1 | | | | .858 |
| CB2 | | | | .830 |
| CB4 | | | | .849 |
| CB5 | | | | .815 |
| CM2 | | | .831 | |
| CM3 | | | .819 | |
| CM4 | | | .822 | |
| CM5 | | | .822 | |
| CD1 | 0.748 | | | |
| CD2 | 0.802 | | | |
| CD3 | 0.791 | | | |
| CD4 | 0.759 | | | |
| CD6 | 0.736 | | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

The study undertook confirmatory factor analysis in continuum with the extractive factor analysis as mentioned in sections above. The confirmatory factor analysis paved the way for the confirmation of the aforesaid factor structure. The validity confirmation modeling (as illustrated in figures in this section) established the factor structure for the constituent factors. The extractive factor analysis was the first step towards the selection of items that load satisfactorily. The consecutive confirmatory analysis confirms the factor structure. SPSS AMOS version 20.0 was utilized for calculation of confirmatory analysis across the constituent factors in order to validate the measure of all the assumed variables. The research hence performed confirmatory factor analysis with aid of 'Maximum Likelihood method' of factor analysis. This technique has been observed to lead to more reliable results and the condition is that the minimum ratio of sample elements to the parameters to be estimated should be in the range of 5:1.The results as highlighted in figure 2 below illustrates the statistically significant impact of independent variables namely the AI chatbots, AI voice assistants and AI calculations and choice making on the customer decisions across e-commerce platforms. The beta coefficients or path regression weights as marked on the path diagram were observed in range greater than 0.1 and the respective data model fit indices were in range 0.8 to 0.95 respectively. The RMSEA measures were observed as less than 0.1. The respective bootstrapping outcomes are also illustrated in figure below, which point to the significant mediation impact as well. The chatbots as instruments of communication and interaction were observed as more effective than voice assistants and choice making platforms in influencing the customer decisions while shopping on e-commerce platforms (Tables 5, 6).



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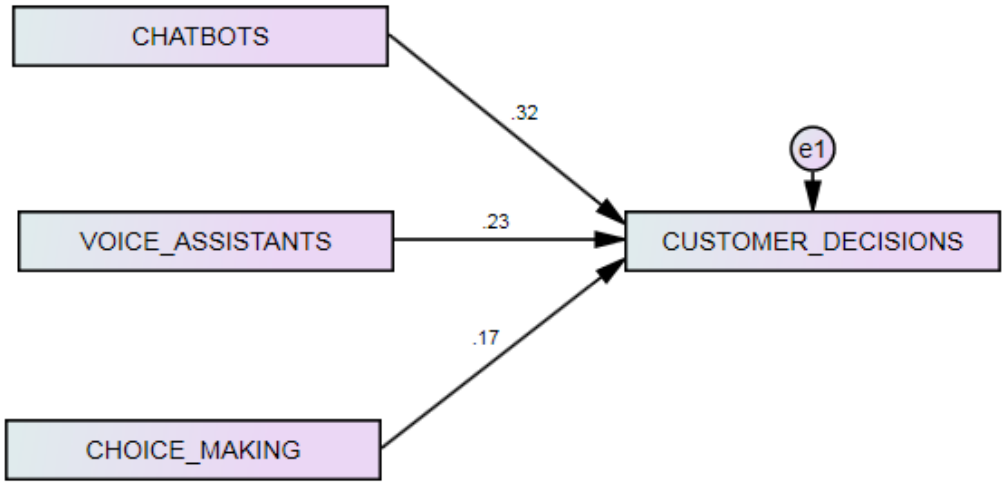


**FIGURE 2**
**REGRESSION RELATIONSHIPS**

**Table 5**
**SEM OUTCOMES**

| | | | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| CUSTOMER_DECISIONS | <--- | CHATBOTS | .353 | .047 | 7.437 | *** | par_1 |
| CUSTOMER_DECISIONS | <--- | VOICE_ASSISTANTS | .233 | .043 | 5.372 | *** | par_2 |
| CUSTOMER_DECISIONS | <--- | CHOICE_MAKING | .194 | .050 | 3.919 | *** | par_3 |

**Table 6**
**BOOTSTRAPPING**

| Parameter | | | Estimate | Lower | Upper | P |
|---|---|---|---|---|---|---|
| CUSTOMER_DECISIONS | <--- | CHATBOTS | .321 | .213 | .433 | .014 |
| CUSTOMER_DECISIONS | <--- | VOICE_ASSISTANTS | .232 | .103 | .339 | .009 |
| CUSTOMER_DECISIONS | <--- | CHOICE_MAKING | .169 | .064 | .276 | .015 |

## CONCLUSION

The study hence concludes significant impact of AI impetus and technological advancements on the shaping of customer behavior attributes. The chatbots usage was observed to cast more significant impact on the customer decisions than any other form of machine-customer interfaces. The observed outcomes further vindicate the earlier studies (Silva, Shojaei, & Barbosa, 2023), (Vassilakopoulou, Haug, Salvesan, & Pappas, 2023) that uphold the relevance of usage and incorporation of chatbots (Table 7).

**Table 7**
**SUMMARIZING THE OUTCOMES**

| **Hypothesis Statements** | **Outcome** | **Literature Support** |
|---|---|---|
| H1: There is significant impact of AI based voice assistant services on customer decision making | Supported | (Nica, Sabie, Mascu, & Lutan, 2022), (Bogert, Schecter, & Watson, 2021) |
| H2: There is significant impact of AI based chat services on customer | Supported | (Li, Zhong, Zhang, & |



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| | | |
|---|---|---|
| decision making | | Zhao, 2022), (Silva, Shojaei, & Barbosa, 2023) |
| H3: There is significant impact of AI based calculation and choice making on customer decision making | Supported | (Schiessl, Dias, & Korelo, 2022), (Stinson, 2022) |

## Implications

The research outcomes possess implications for fine tuning the human-machine interfaces while marketing the products online and across e-commerce channels. The study based outcomes could be critical in shaping the customer pull across FMCG marketing , personal care product marketing and grocery product marketing across evolving small to medium scale enterprises and their interfaces.

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