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## **Exploring the Antecedents and Outcomes of Artificial Intelligence (AI) Adoption in B2C E-Markets: A Critical Structural Equation Modeling (SEM) Approach**

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### **Introduction**

Artificial Intelligence (AI) (**Al-Dmour, 2022<sup>1</sup>**) connotes to application of various computers and IT technologies which acts like human rather beyond the imagination of human being with utmost accuracy and relatively at less cost. It tremendous (**Edesiri, 2013<sup>2</sup>**) benefits in the field of business and other related activities has attracted various business units to invest and deploy the various feature available in the market through understanding the ongoing languages, and converting the various patterns and taking relevant decision to solve the routine complex problem which may be a dream for the human being.

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<sup>1</sup>Al-Dmour, R., Amin, E.A., Saad, N., Zaidan, H. (2022): Interrelated Factors Influencing the Adoption of Big Data Applications: Empirical Study in Jordan. – Jordan Journal of Business Administration 18(2): 203-222.

<sup>2</sup>Edesiri G.Okoro and Promise E. Kigho Department (2013). The problems and prospects of E-transaction. Journal of Research in International Business and Management, Vol. 3(1),10-16

Broadly talking the **AI (Alsheibani,2020)<sup>3</sup>**, may be classified into three categories Narrow Artificial Intelligence (which is structured to do the particular jobs like voice assistance, speech recognition and voice recognition instructions by the users (Apple (Siri), Alexa (Amazon), Various algorithms (Amazon and Netflix), General Artificial intelligent relatively perform more advanced jobs which accordianlike to human being such as the capability (**Hasan, ,2021)<sup>4</sup>** to understand and react, learning by experience and application of reasoning power to take the relevant decisions and the last one is the Super intelligent Artificial intelligence which make our machines to think above than normal human being and performing such task which are beyond human imagination (**Ghani, 2022)<sup>5</sup>**.

Seeing the tremendous benefits of AI, Many Companies (**C.Rogers(2006)<sup>6</sup>** have started using AI in performing business operations such target customer through segmentation and Personalization, use of Predictive Analysis and interpretation to perform complex tasks, use of automatic Chatbots to assist routine task on 24X& basis , creation of vital content to perform business operation quickly at lowest cost, use of sentiment analysis operation to get regular feedback from the customer, performing campaign work for the business on auto mode as per

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<sup>3</sup>Alsheibani, S.A., Cheung, Y., Messom, C., Alhosni, M. (2020): Winning AI Strategy: Six-Steps to Create Value from Artificial Intelligence. Lake City, United States, Americas Conference on Information Systems 11p

<sup>4</sup>Hasan, A.R. (2021): Artificial Intelligence (AI) in accounting & auditing: A Literature review. – Open Journal of Business and Management 10(1): 440-465

<sup>5</sup>Ghani, E.K., Ariffin, N., Sukmadilaga, C. (2022): Factors Influencing Artificial Intelligence Adoption in Publicly Listed Manufacturing Companies: A Technology, Organisation, and Environment Approach. – International Journal of Applied Economics, Finance and Accounting 14(2): 108-117

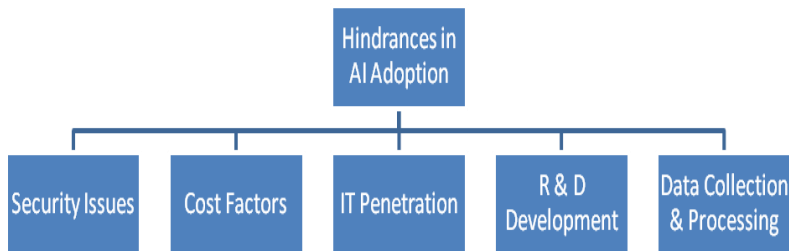
<sup>6</sup>C.Rogers(2006), Doing without money: a critical assessment of woodford"s analysis. Cambridge Journal of Economics, 2006, 30, 293-306

the direction, offering suitable pricing strategies to attract the customer keeping their needs in mind, to have a track of the customer with respect to their choice need and emotions attributes, sending regular messages and receiving relevant information to know the satisfaction level of the customer and resolving their queries if any which in turn enhance the customer satisfaction and largely increase the market share through customer satisfaction (**Chong, 2009<sup>7</sup>**).

Objective of the Study: The core objectives of the present research are:

1. To analyze the obstacles in the adoption of AI in B2C e-markets
2. To provide the solution for the obstacles on the way of AI adoption.

### Conceptual model



### **Hindrances in AI adoption in B2C E-markets**

The present research paper is an attempt to explore the various constructs creating hurdles to exploit the AI in developing and

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<sup>7</sup>Chong, A.Y.L., Lin, B., Ooi, K.B., Raman, M. (2009): Factors affecting the adoption level of c-commerce: An empirical study. – Journal of Computer Information Systems 50(2): 13-22

implementing the various business strategies. Since the AI is new concept recently evolved therefore only few studies have been conducted so far throwing lights on the adoption of AI in business (**Al-Dmour,2022**<sup>8</sup>).

Artificial intelligence (AI) is a new wind blowing all over the world and has become talk of the town due to its enormous benefits at an affordable cost for the companies at the speed of lights. AI use the modern computer system and internet enabled IT (**Hasan,2021**<sup>9</sup>) services (such as web , email, social media apps etc.) and also various algorithm (**Hair, 2014**)<sup>10</sup>**&Hair(2014)**<sup>11</sup> to process the raw data and produce the concrete results which are very useful in drafting today modern marketing (**Emetaram,2021**<sup>12</sup>) strategies by the business organizations. Since the AI and its implementation in business undertaking is very vast, the present study focuses on one of its dimension on B2C e-markets.

AI algorithms (**Alsheibani,, 2020**<sup>13</sup>) Ionescu study the consumer attitude analyze consumer attitude and their preferences and thereby suggest the business organizations to target the

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<sup>8</sup>Al-Dmour, R., Amin, E.A., Saad, N., Zaidan, H. (2022): Interrelated Factors Influencing the Adoption of Big Data Applications: Empirical Study in Jordan. – Jordan Journal of Business Administration 18(2): 203-222.

<sup>9</sup>Hasan, A.R. (2021): Artificial Intelligence (AI) in accounting & auditing: A Literature review. – Open Journal of Business and Management 10(1): 440-465

<sup>10</sup>Hair, J.F., Gabriel, M., Patel, V. (2014): AMOS covariance-based structural equation modeling (CB-SEM): Guidelines on its application as a marketing research tool. – Brazilian Journal of Marketing, 13(2): 44-55

<sup>11</sup>Hair, J.F., Black, W., Babin, B.J. Anderson, R.E. (2010): Multivariate Data Analysis: A Global Perspective. – 7th ed. Upper Saddle River: Pearson Education 61p

<sup>12</sup>Emetaram, E., Uchime, H.N. (2021): Impact of Artificial Intelligence (AI) on Accountancy Profession. – Journal of Accounting and Financial Management 7(2): 15-25

<sup>13</sup>Alsheibani, S.A., Cheung, Y., Messom, C., Alhosni, M. (2020): Winning AI Strategy: Six-Steps to Create Value from Artificial Intelligence. Lake City, United States, Americas Conference on Information Systems 11p

particular consumer asking the characteristics matching their products and services at an affordable prices. This not only enhances the shopping experience but also increases conversion rates and customer loyalty.(Gefen,2000)<sup>14</sup>

AI (**Alsheibani,,2020**<sup>15</sup>) in business organization is governed by many significant factors such as Cost involved in deploying the AI and corresponding Rate of return , organization nature, size of organisation, available data and processing involved, Available technical skilled labor, organization existing infrastructure, organization goals and existing strategies, Companies existing scale and targets set, Changing market scenario, Legal and ethical issues, companies leadership style and future vision, existing rival pressure. The (**Liao,2008**)<sup>16</sup> other factors which are involved in the AI adoption are the Technologies adoption by the companies, willingness of the stakeholders to bring the change, Hardware and software penetrations involved in the business, exiting infrastructure, Company resources, Expected Rate of return of the companies and the creativity and innovation by the company management (**Ionesco, 2019**<sup>17</sup>) & (**Chukwudi, 2018**<sup>18</sup>): **Adoption of**

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<sup>14</sup>Gefen D, Straub DW and Boudreau MC (2000). Structural equation modeling and regression: Guidelines for research practice. Communication of the Association for Information System. 4(4), 1-79

<sup>15</sup>Alsheibani, S.A., Cheung, Y., Messom, C., Alhosni, M. (2020): Winning AI Strategy: Six-Steps to Create Value from Artificial Intelligence. Lake City, United States, Americas Conference on Information Systems 11p

<sup>16</sup>Liao Z and Wong WK (2008). The determinants of customer interactions with internet-enabled e-banking services. The Journal of the Operational Research Society, Vol. 59, No. 9 (Sep., 2008), 1201-1210

<sup>17</sup>Ionescu, L. (2019): Big data, block chain, and artificial intelligence in cloud-based accounting information systems. Analysis and Metaphysics 18: 44-49.

<sup>18</sup>Chukwudi, O., Echefu, S., Boniface, U., Victoria, C. (2018): Effect of artificial intelligence on the performance of accounting operations among accounting firms in South East Nigeria. Asian Journal of Economics, Business and Accounting 7(2): 1-11

## **Artificial intelligence in B2C E-markets**

### **Factor-1 (Security Issues)**

Security (**Davenport, 2018**)<sup>19</sup> has been the major issue for the most of companies deploying AI adoption in existing marketing system. Many IT professional has started earning money by hacking the website of the companies and demanding huge amount. They (**Hasan, 2021**)<sup>20</sup> can send unwanted various with email which can damage hardware and software penetration of the companies causing huge loss to the companies and it also reduces the image of companies and reduce the customer confidence in such companies. There are numerous internet fraud had been taken place around the world which restricts the user to go online.

H1: Security issues is positively associated with the adoption of B2C e-markets.

H1a: Unwanted attacks by the hackers are positively associated with Security issues

H1b: Unwanted Virus attacks are positively associated with Security issues

H1c: Internet Frauds are positively associated with Security issues

H1d: Open internet penetrations are positively associated with Security issues

H1e: Cyber Crimes are positively associated with Security issues

### **Factor 2 (Cost Factor)**

Cost is another important hindrance on the way of adoption of AI in B2C e-markets. Introducing Computer software (**Ionesco,**

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<sup>19</sup>Davenport, T.H., Ronanki, R. (2018): Artificial intelligence for the real world. – Harvard Business Review 96(1): 108-116

<sup>20</sup>Hasan, A.R. (2021): Artificial Intelligence (AI) in accounting & auditing: A Literature review. – Open Journal of Business and Management 10(1): 440-465

**2019)** and hardware get updated very fast and huge amount is required to update these penetration.

H2: Cost Factor is positively associated with the adoption of B2C e-markets.

H2a: Huge Cost is positively associated with Cost Factor

H2b: Maintenance Cost is positively associated with Cost Factor

H2c: Lack of IT Professionals is positively associated with Cost Factor

H2d: Hardware and software penetration is positively associated with Cost Factor

H2e: Monitoring Issues is positively associated with Cost Factor

### **Factor-3 (IT penetration)**

Another major hindrance on the way AI adoption is the lack of IT penetration (Ionesco, 2019<sup>21</sup>) available for the companies including lessor resources to the organization, Advanced hardware system not easy to avail and cope with, lack of empathy and other emotional variables (**Chukwudi, 2018**)<sup>22</sup>

H3: IT Penetration is positively associated with the adoption of B2C e-markets.

H3a: Lack of resources is positively associated with IT Penetration.

H3b: Advanced Hardware is positively associated with IT Penetration.

H3c: Lack of Empathy is positively associated with IT Penetration.

### **Factor-4 (Research and Development)**

AI can only be implemented if the companies are governed by

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<sup>21</sup>Ionescu, L. (2019): Big data, block chain, and artificial intelligence in cloud-based accounting information systems. – Analysis and Metaphysics 18: 44-49.

<sup>22</sup>Chukwudi, O., Echefu, S., Boniface, U., Victoria, C. (2018): Effect of artificial intelligence on the performance of accounting operations among accounting firms in South East Nigeria. Asian Journal of Economics, Business and Accounting 7(2): 1-11

the sound R&D on regular basis which is hardly possible of the small and medium organization (**Ionesco. 2019<sup>23</sup>**)

H4: Research and Development is positively associated with the adoption of B2C e-markets.

H4a: creativity and originality is positively associated with R & D.

H4b: Lack of Understanding is positively associated with R & D.

H4c: Lack of Solution is positively associated with R & D.

#### **Factor-5 (Data collection and processing)**

AI process bulk of data with latest machines and moreover the success of AI depends on the accuracy of the data collected and process as per the desired directions (**Emetaram, 2021**).

H5: Research and Development is positively associated with the adoption of B2C e-markets.

H5a: Data Accuracy is positively associated with Data Collection and processing.

H5b: Data processing cost is positively associated with Data Collection and processing.

Exploratory Factor Analysis Table: 1			
Constructs	Statements	Factor Loading	Cronbach X
Security Issues	There is always a fear of unwanted attacks by the hackers	.902	.931
	Unwanted virus may interrupt the system.	.897	
	Internet fraud restrict in using AI	.881	
	Internet is an open system can be tracked by the experts	.765	
	There is increase in Cyber crime	.823	
Cost Factor	Implementation of AI involves huge	.941	.876

<sup>23</sup>Ionescu, L. (2019): Big data, block chain, and artificial intelligence in cloud-based accounting information systems. – Analysis and Metaphysics 18: 44-49.



	costs		
	Maintenance of AI system is very costly	.921	
	IT professional are hardly available in the markets rather at high prices	.783	
	High-tech Hardware and software penetration are not easily available	.832	
	AI requires regular monitoring by the IT professionals	.765	
IT Penetration	Companies lack in resources	.887	.791
	Advanced Hardware and software are not easily available	.902	
	There is absence of empathy	.657	
R&D Factors	AI lack in creativity and originality	.768	.846
	Presently, there is less understanding and common sense in AI	.711	
	AI can not provide readymade solution to the problem ethically and practicability	.699	
DATA collection and processing	It highly depends upon the accuracy of the data	.876	.810
	Cost of data collection and processing is very high	.821	

### **Empirical Results**

The above table 1 shows the factor analysis of the factors explored during the research work pertaining to AI adoption in B2C E-markets by the organizations using the SPSS software. It also shows the reliability test of the various factors associated with the present constructs.

As a rule of thumb the previous research shows that 0.4 for each factor means the particular constructs should be exclude from the research.

<b>Results of Confirmatory Factor Analysis &amp; Hypothesis Testing : Table 2</b>				
<b>Construct and Measurement</b>	<b>Construct Loading</b>	<b>t-value</b>	<b>R-Square</b>	<b>Hypothesis Result</b>

Item				
Security Issues				
S1	.9132	20.2826	.9762	Significant
S2	.8761	18.3725	.6764	Significant
S3	.9210	21.3472	.7792	Significant
S4	.9092	19.2837	.7161	Significant
S5	.7532	15.2947	.8819	Significant
Cost Factor				
C1	.9731	24.3453	.9642	Significant
C2	.8643	21.2987	.8429	Significant
C3	.7543	18.9861	.7111	Significant
C4	.8292	17.2832	.8001	Significant
IT penetration				
I1	.8823	24.2735	.8901	Significant
I2	.8765	19.8161	.8023	Significant
I3	.7654	22.2725	.7721	Significant
Research & Development				
R1	.7654	11.1725	.7231	Significant
R2	.8423	18.2826	.7790	Significant
R3	.8765	18.9282	.8543	Significant
Data Collection & Processing				
D1	.7654	21.2281	.7324	Significant
D2	.6875	17.2826	.6678	Significant
Latent Variable				
$\beta_1$	.3765	8.7356		
$\beta_2$	.2543	7.7544		
$\beta_3$	.1123	5.2632		
$\beta_4$	.1245	2.2456		
$\beta_5$	.1123	1.9872		

In the above table it is clearly exhibit that the First Hypothesis H1 and all the other associated hypothesis related to first factor Security issues are accepted as the t-value is greater than the tabulated value. (Security issues is one of the significant hindrances for the AI adoption in B2C e-markets by the company) corresponding the path coefficient  $\beta_1$  also in the Confirmatory Factor Analysis in the conceptual model ( $S \rightarrow DE$ ) is .3765 which is positively significant at the 0.01 level. H1a,

H1b, H1c, H1d, H1e are also accepted in the above model as the tabulated value is greater 20.2826,18.3725,21.3472,19.2837 and 15.2947 respectively. Similar is the case of other hypothesis H2, H3, H4 and H5 all are accepted in the present research thus it is concluded that the AI adoption in B2C market is hurdled by these five factors significantly.

### **Discussion and Implementation**

The above discussion reveals that the AI adoption in B2C e-markets is still at infancy stage in India as there are many reasons which restrict the companies to participate in these markets with the help of AI. The first major cause behind the slow growth of AI is the Security and threats posed by AI as the internet is an open system and it is beyond the control of single or few people. Many internet (Olalekan, 2013)<sup>24</sup> experts can reach to you does not matter where are you and where they are located is hard to know. With the help of powerful software and hardware they can see the entire data of your system and can do anything the like to (Warren, M., 2003)<sup>25</sup>. The second reason is the huge cost involved in the use of AI in business organization (Vimala, 2016)<sup>26</sup>. The other three important causes are IT penetration, R & D and Data processing issues involved in AI adoption. Undoubtedly AI shall prove to be a significant tool in the hands of business organization but it needs to be improvised before it is used in the organization.

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<sup>24</sup>Olalekan S. Akinola (2013). Cashless Society, Problems and Prospects, Data Mining Research Potentials. Volume 3, Issue 8

<sup>25</sup>Warren, M., & Hutchinson, D. (2003). Security for Internet banking: a framework. Logistics Information Management, 16(1), 6

<sup>26</sup>Vimala, V(2016). An Evaluative Study on Internet Banking Security among Selected Indian Bank Customers. Amity Journal of Management Research 1(1), (63–79)