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Article

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**BENEFITS AND RISKS OF INTRODUCING ARTIFICIAL INTELLIGENCE
IN COMMERCE: THE CASE OF MANUFACTURING COMPANIES
IN WEST AFRICA**

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Abstract

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With innovations in technology, the application of artificial intelligence (A.I) in the area of commerce is rising to the top with an expected growing number of business transactions not just for entrepreneurs but for consumers as well. It advances the understanding of how A.I. can be used to enhance businesses around the world by establishing their presence online to reach customers beyond borders. This study highlights the benefits and risks of introducing A.I. into trade in terms of how the commerce industry operates and revolutionize products shopping. Significantly, the primary aim of this paper is to explore ways A.I. is integrated into commerce to help understand its impact on existing/potential customers and its efficiency in sales processes. With a sample size of 2,903 manufacturing companies in four West-African countries, the empirical results show that value-based adoption of A.I. approach outperforms the traditional/human search of customers' products delivery in both convenience, accuracy and profitability. Furthermore, A.I. approach within commerce achieved competitive advantage with several modernized customer service machine learning approach such as automated content creation, voice assistance, image search among others. Clearly, this shows that the application of A.I system into commerce introduces significant competitive advantages in terms of trust, quality, openness and security.

Keywords: Artificial Intelligence, Human Interaction, Commerce, Value-based Adoption model (VAM), Probit Model, West Africa

JEL Classification: O2, O3, O33

Introduction

In recent years, artificial intelligence (A.I.) has drawn attention as a key for economic growth in developed countries. Indeed, Sutton and Treffer (2016) describe both theoretically and empirically how developing countries such as China initially entered new markets at a low level of quality but over time developed the capabilities to deliver high-quality, and internationally competitive goods and services via A.I. technology. This is mainly due to the attention been focused on developing new A.I. information communication technology (Lu et al., 2018). The use of A.I. technologies offer many benefits (Canbek and Mutlu, 2016) and risks (Alzahrani, 2019). It brings the appearance of normal human language use into a new social relation between machines and humans (Barrett et al., 2019; Sanzogni, 2017). This innovative media presents a powerful technology that uses analytics to determine news feeds, information, products and purchases (Cunnean et al., 2019). Notably, it is a fundamental, pervasive economic and organizational phenomenon that holds many opportunities in store for management (Foss, 2005). Again, A.I. unlike the natural intelligence displayed by humans is transforming the face of commerce in the business world and how it creates products and services to customers (Armbrust et al., 2011). Additionally, China has become the focal point for much of the A.I. discourse. For instance, China has developed significant commercial A.I capabilities, evidenced by companies such as Baidu (a search engine like Google), Alibaba (an e-commerce web portal like Amazon), and Tencent (the developer of WeChat, which can be seen as combining the functions of Skype, Facebook and Apple Pay). Today, A.I remains the most spectacular I.T application, a technology that has gone through an unequalled development over the last decades (Blanchet et al., 2019; Lee et al., 2018; Wiljer and Hakim, 2019). In business, A.I is relevant to any intellectual task because it is becoming an imperative for firms that want to maintain a competitive edge. In this way,

humans can use A.I. to help game out possible consequences of each action and streamline the decision-making process. However, the growing of A.I innovation led businesses to make decisions to adopt new technology to address customer needs and support product services aimed at satisfying commerce transactions (Ekufu, 2012). On the other hand, consumer trust is more important in cyber transactions than it is in traditional transaction because trust is a prerequisite for successful commerce and as a result customers are hesitant to make purchases unless they trust the seller (Gefen, 2002; Jarvenpaa et al., 1998; Kim et al., 2007). Although, there have been some limitations with A.I. adoption in commerce, there are various avenues of corporate decision making and problem-solving by A.I usage such as data mining, credit worthiness, stock market predictions among others. By definition, A.I is best understood as a set of techniques aimed at approximating some aspects of human or animal cognition using machines (Calo, 2017). According to Huang and Rust (2018) and Syam and Sharma (2018) A.I is manifested by machines that exhibits aspects of human intelligence and involves machines mimicking intelligent human behaviour. This means that it relies on several key technologies, such as machine learning, natural language processing, rule-based expert systems, neural networks, deep learning, physical robots, and robotic process automation (Davenport, 2018). Furthermore, A.I involves the use of a computer to model intelligent behaviour with minimal human intervention (Benko and Lanyi, 2009; Haenlein and Kaplan, 2019; McCorduck et al., 1977). In sum, A.I. can be defined as a section of informatics and applied computer science to pattern human proceedings of problem solving and transfer them to computers in order to invent efficient and new solutions as well as course of actions. Therefore, A.I. is a computer program running on any possible device or data center with the skill to interact with its environment (Dautenhahn, 2007). However, the adoption of such technology starts instead with profits because profits are at the core of arguments supporting the introduction of A.I. in trade (Agrawal et al., 2018). Nevertheless, information technologies have become ubiquitous in professional activities, disrupting and affecting all core processes and operations (Devaraj and Kohli, 2003). Considering the importance of A.I. in today's commerce, this paper explores the benefits and risks of introducing such a mechanism into trade. Furthermore, this study reviews the process of A.I. in commerce together with the processes of conducting businesses for profit or not for profit goods, commodities, property or services in the field of commerce. Therefore, the objective of this study is to address the following research questions: firstly, does the introduction of A.I improves commerce performance at both the organizational and process level and secondly, what is the business value of A.I based projects within organizations. From above background, the authors draw seven key hypothesis:

- H1: Usefulness of A.I positively affects the customer's purchase decisions.
- H2: Trust of A.I negatively affects the consumer's risk of a transaction.
- H3: Data management in A.I will more likely affects the adoption of its usage.
- H4: Experts knowhow in A.I will more likely affects the adoption of its usage.
- H5: Cost incur will more likely affects the firm's adoption of its usage.
- H6: A.I privacy protection positively affects the consumer's intention to purchase on the internet.
- H7: Overall value of A.I positively affects the introduction of such technological tool.

To conclude this overview, it is worth noting that A.I. is here to stay and will be an integral part of the future of the retailing and commerce sector affirming the power for commerce businesses to explore countless opportunities to improve customer experiences, better understand their customers and generate profits from firms operations.

1. Literature review

1.1. Value-based Adoption Model (VAM)

Value-based adoption model (VAM) proposed by Kim et al. (2007) empirically test this novel approach towards understanding consumers' adoption of technology. Kim et al. argued that the TAM has limitations in explaining new ICT acceptance and that those who accept new ICT are not just technology users but also consumers. Furthermore, they claimed that the main interests of technology users in an organization are usefulness and ease of use, but that rational consumers focus more on maximization of value (Lin et al., 2012). VAM saw benefits and sacrifice as the main factors of value and analyzed intention to use. Additionally, it is based on a cost-benefit paradigm which reflects the decision-making process where the decision to use is made by comparing the cost of uncertainty in choosing a new technology or product. Empirically, this means that VAM aims to explain the adoption of technology in order to overcome the limits of technology acceptance model in a new ICT environment (Lin et al., 2012). However, Davis et al. omitted attitude in the final TAM due to its weak mediation of beliefs on adoption intention. Empirical studies have found that attitude does not influence intention directly, and that TAM retains its robustness even without including attitude (Davis et al., 1989; Venkatesh et al., 2003). Again, they concluded in their review of IT acceptance research that attitudinal constructs are significant only when specific cognitions (performance and effort expectancies) are not included in the model (Venkatesh, 2003).

From figure no. 1 results that perceived value is affected by benefits and sacrifices.

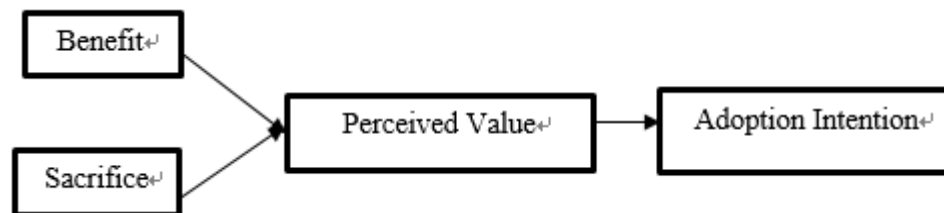


Figure no. 1. The Basic Concept of Value-based Adoption Model (VAM)

Source: Kim et al., 2007

Perceived value affects adoption intention and as a result perceived benefits are derived from the cognitive evaluation theory (Deci, 1971) which classifies motivations into extrinsic and intrinsic subsystems. Extrinsic motivation refers to the performance of an activity to achieve a specific goal while intrinsic motivation refers to the performance of an activity for no apparent reinforcement other than the process of performing the activity per se (Davis et al., 1989). Both extrinsic and intrinsic factors have been found to influence perceived value and behavioral intention and these findings also apply to information systems (Moore and Benbasat, 1991). Clearly, this means that perceived value is defined as

the subjective evaluation of consumers of the trade-off between benefits and costs of products or services (Zeithaml, 1988). The definition of perceived value by Zeithaml (1988) is widely used and indicates an overall evaluation by consumers of the usefulness of products. Again, value is derived from comparison of the acquired benefits with costs paid, and costs paid must consider sacrifice of effort and time as well as monetary aspects (Bolloju et al., 2002). Additionally, sacrifices are both monetary and nonmonetary. Monetary spending includes the actual price of the product, and it is generally measured based on customers' perceptions of the actual price paid. Non-monetary costs usually include time, effort and other unsatisfactory spending for the purchase and consumption of the product (Thaler, 1985; Zeithaml, 1988).

1.2. Application of proposed framework and hypothesis

Taking into account above arguments, the study develop hypothesis around Value-based Adoption Model (VAM) into trade / commerce. According to this theory of utility, users try to achieve maximum utility or satisfaction given their resource limitations. It is crucial to mention that artificial intelligence (A.I) technologies are developing apace with many potential benefits for economies, societies, communities and individuals. In considering the potential impact of A.I on commerce provide for a suite of technologies that perform tasks usually associated with human intelligence.

Taking into account figure no. 2, usefulness ensures the quality of having technological system and especially practical worth or applicability while trust in A.I usage bring confidence and/or reliance on the integrity and strength of products transaction.

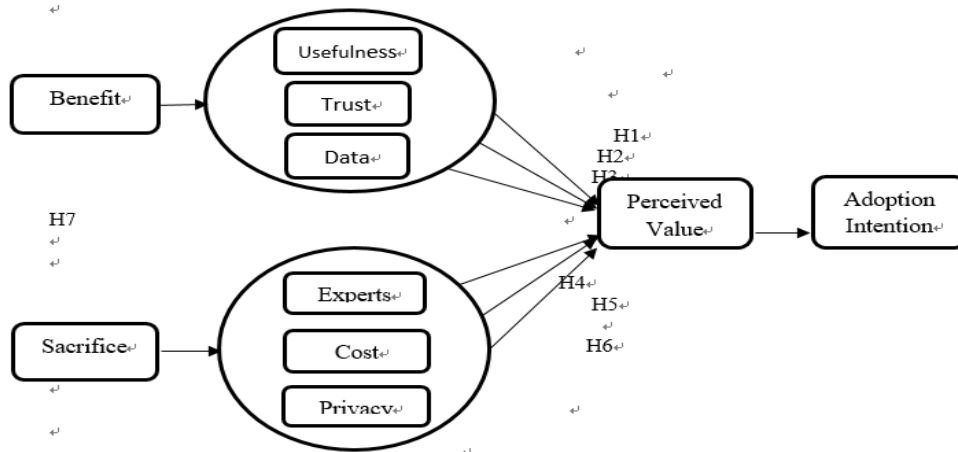


Figure no. 2. Proposed Framework and Hypothesis of Value-based Adoption Model (VAM)

Also, Data management allows permit smooth analysis and exploitation of the data derived from production to be carried out in real time. With regards to barriers to sacrifice, the lack of experts of A.I pose as the scarcity of professionals with skills and experience in this type of implementations. Moreover, it's crucial in these cases to have individuals (professionals) who have experience on projects of the same magnitude. Likewise the fee of introducing A.I into commerce which requires huge costs as it is a complex machine. Apart from the

installation cost, its repair and maintenance also require huge costs. Lastly, A.I technology privacy as to protecting personal data and ensuring users of A.I that their information is confidential and management of data protection is a challenge to most organizations. It is on this premise that the study seeks to address above-mentioned hypothesis taking into consideration proposed variables.

1.3. Success factors impacting artificial intelligence into trade/commerce

The introduction of A.I. has immense contribution to the development of the business/commerce industry in the area of product customization, market trend analysis, target marketing, customer relationship management, web personalization among others. Below are some key benefits of introducing artificial intelligence into trade/commerce. Firstly, artificial intelligence enhance creative tasks by freeing users from routine and repetitive tasks and allows them to spend more time on creative functions. In doing so, allows robots to develop repetitive, routine and process optimization tasks automatically and without human intervention. Secondly, A.I reduces failures caused by human limitations. In some production lines, A.I is used to detect, by means of infrared sensors, small cracks or defects in parts that are undetectable by the human eye. Thirdly, A.I control and optimize of productive processes and production lines more efficiently via error-free processes and obtain greater control over production lines in the company. This not only increases productivity at the machine level, it also makes workers more productive and increases the quality of the work they do because having more information allows workers to have a more focused view of their work and make better decisions. Furthermore, there is **improvement** in decision making at both production and business levels. Meaning, by having more information in a structured way, it allows each of the people in charge to make decisions in a faster and more efficient way. Lastly, there is efficiency in data acquisition and analysis whereby computers always worked with data extraordinarily well and A.I is extremely good at working with high volumes of data that humans simply cannot handle.

1.4. Barriers of introducing artificial intelligence into trade/commerce

With regard to the limitations of introducing A.I into commerce, below are some of the most common factors that can occur in the business environment. The first risk is the cost and installation time of A.I projects. The cost of installation both at the time and the economic level, is a very important factor in choosing to execute this type of project. Companies that lack internal skills or are not familiar with AI systems, must value the outsourcing of both implementation and maintenance in order to obtain successful results in their project. Another obstacle that often occurs at the business level for introducing A.I is the lack of qualified professionals to manage / operate the technology. Thirdly, artificial intelligence cannot be improved with experience because they perform the same function again if no different command is given to them. With time, it can lead to wear and tear. Again, it stores a lot of data but the way it can be accessed and used is very different from human intelligence. This means that A.I technology cannot cope up with the dynamic environment and so they are unable to alter their responses to changing environments. Moreover, artificial intelligence lack privacy consideration as it may pose a great challenge for humanity if it reaches a very advanced stage. At what point may a machine be deemed sentient, conscious, and therefore entitled to similar to what we call human rights. We may never reach this stage of A.I seen it

may not be as hard as some imagine but early awareness of A.I’s privacy considerations is necessary for safeguarding users personal information.

1.5. Effects of COVID-19 pandemic on implementing artificial intelligence

A.I offers industries an avenue to sustain economic activities and business performance during times of crisis. Fundamentally, the lapses of increasing security threat needs to be address especially in developing countries. Currently, the impact of COVID-19 situation has resulted in the growing use of artificial intelligence in trade / commerce. Significantly, the effect of A.I stands to promote reliable and practical implementation of digital marketing across businesses. Moreover, the applications of Artificial Intelligence has the potential to solve challenges in the distribution of goods during unforeseeable events like COVID-19 pandemic among others. Again, its implementation would provide some practical insights on how the pandemic threatens the closure of small businesses and also, preventing consumers’ access to essential household goods. Undoubtedly, it should be echoed that to implement A.I, the development of strong institutions with strict regulation / governance on cyber transaction is pivotal. Moreover, the effect of COVID-19 on implementing A.I, for instance, in the manufacturing sector can help citizens limit the spread of infection as it prevents people from moving around since a lot of orders will be carried out online. In sum, governments need to ensure that the supporting technology for A.I is adequate in its performance and the establishment of centralized platforms for data management.

2. Methodology

In order to perform our empirical analyses, the study uses questionnaire survey conducted in four West-African countries, namely: Ghana, Nigeria, Togo and Burkina Faso. The selected countries were chosen because of the large number of manufacturing and production companies located in these countries. Furthermore, the responded data for this study were collected via an online platform. A total of 3,000 questionnaires were administered online and afterwards, the study analyzed completed data of 2,903 from manufacturing companies (after accounting for missing data). Nevertheless, the study examines perceived value as the comparison between benefit and cost (sacrifice) which compares (1) usefulness, trust and data management (2) experts, cost and privacy and (3) Overall value of introducing artificial intelligence into trade/commerce. Significantly, the research model and the proposed hypothesis were evaluated by the probit model in examining the benefits and risks of introducing A.I. into commerce using manufacturing companies in four West African countries. Also, the probit model regression was performed using the 40 items drafted in the questionnaire survey via manufacturing companies’ performance status as dependent variable. Empirically, let $Mijt$ denote the performance status of technology $i = 1, \dots, nj$ in manufacturing $j = 1, \dots, J$ at time point $t \in (0,1)$. Performance status is assumed to be continuous and ranges from Strongly Disagree (1), Disagree (2), Not Sure (3), Agree (4), or Strongly Agree (5) in the questionnaire survey using SPSS version 26. In addition, the likert scale data is defined in SPSS as “1/2/3/4/5”. The coding of underlying status $Mijt$ to observed, discrete technology performance category $Mijt$ is given by the standard measurement model:

$$Mijt \begin{cases} 3 & \text{if } Mijt \leq k1 \\ 2 & \text{if } k1 < Mijt \leq k2 \\ 1 & \text{if } Mijt > k2 \end{cases} \tag{1}$$

where the parameters, k , are unobserved and must be estimated from the data. The categories are ordered from worst to best. This facilitates the qualitative interpretation of regression coefficients, where a positive sign indicates acceptance and improvement of technological usage (A.I) and, thus, the probability of reporting no problems. In addition, introducing A.I. technology at any time point t is described by the equation:

$$Mijt = aij + \phi_j + xij\beta + Tvj + (T \cdot xij)\psi + \varepsilonijt \tag{2}$$

with

$$vj = \mu + yj \tag{3}$$

The bearing xij is a set of benefits-risk adjustment variables that are, in this case, time invariant, where beta (β) is the estimate of the influence of each variable. Treatment is modelled as a dummy variable T , which takes a value of 1 if $t = 1$ (post-introduction) and 0 otherwise. The direct effect of treatment performance on post-introduction technology (A.I) usage is given by the coefficient vj . Afterwards, the study computes the probability of reporting a specific post-introduction performance status category ($m=1, 2, 3$), based on the estimated load exerted by the manufacturing and production companies in providing better services as determined indirectly from above equations. This is given as:

$$Prob (Mjl = m/x, yj \hat{a}ij = \phi_j = 0) = \phi(km-Sjl) - \phi(km-1-Sjl) \tag{4}$$

where

$$Sjl = \mu + x'\beta + x'\phi + yj \tag{5}$$

Moreover, using SPSS version 26, the study performed a reliability test. By reliability measurement, all proposed variables show good internal consistency with resulting Cronbach's alphas (α) ranging between 0.802 and 0.932.

According to Cronbach (1951), if all the scale items are entirely independent from one another (i.e., are not correlated or share no covariance), then $\alpha = 0$ and if all the items have high covariance, then α will approach 1 as the number of items in the scale approaches infinity. In other words, the higher the alpha (α) coefficient, the more the items have shared covariance and measure the underlying concept. From table no. 1, the coefficient test of internal consistency is acceptable.

Table no. 1: Summary Coefficient Output

No.	Variable	Cronbach Alpha
1	Usefulness	0.932
2	Trust	0.802
3	Data	0.871
4	Experts	0.836
5	Cost	0.825
6	Privacy	0.902
7	Value	0.916
8	Adoption	0.873

3. Analysis and discussion of results

The characteristics of respondents described and grouped by sex, age, level of education, length of work and categories of manufacturing companies in four selected West African countries. The profile of respondents are indicated in table no. 2 below. It is explained that male manufacturers occupies 55.39%, which means that men are in control of such an industry and key decision makers of such digital technological usage into commerce than women with a score of 44.61%. Again, the study recorded 47.61% of industry players who are over 41-50 years of age. As Ahadiat (2008) found the same result that such age bracket are more positive in the utilization of such technological media. Furthermore, 54.15% of the respondents attained a bachelor's degree and this juxtapose the technological skills they possesses in using artificial intelligence tool in their line of operations. Likewise, the working period which influence their capabilities in digital platform. From the table, 36.31 % of the respondents have been in the industry for over 21 years and this immensely had contributed to the success story of introducing artificial intelligence into trade/commerce. Lastly, top three sub-sector manufacturers that contributed hugely to the study were the aluminium sector (20.01%), followed by textiles (15.77%) and then automotive (13.88%). Clearly, this shows the adoption rate of manufacturers in promoting the use of artificial intelligence in their business transactions.

Table no. 2. Demographic of Respondents Country 4

Variables	Total Sample (N)	Country 1 Ghana	Country 2 Nigeria	Country 3 Togo	Country 4 Burkina Faso
	2,903	738	984	529	652
	2,903	738	984	529	652
	(100%)	(25.42%)	(33.90%)	(18.22%)	(22.46%)
Gender:					
Male	1,608	451	589	233	335
	(55.39%)	(15.54%)	(20.29%)	(8.03%)	(11.54%)
Female	1,295	287	395	296	317
	(44.61%)	(9.89%)	(13.61%)	(10.20%)	(10.92%)
Total	12,903	738	984	529	652
Age:					
Less than30	318	87	93	65	73
	(10.95%)	(2.97%)	(3.20%)	(2.24%)	(2.51%)
31-40	542	134	197	80	131
	(18.67%)	(4.62%)	(6.79%)	(2.76%)	(4.51%)
41-50	1,382	357	479	248	298
	(47.61%)	(12.30%)	(16.50%)	(8.54%)	(10.27%)
51 and above	661	160	215	136	150
	(22.77%)	(5.51%)	(7.41%)	(4.68%)	(5.17%)
Total	2,903	738	984	529	652
Marital Status:					
Single	102	23	19	22	38
	(3.51%)	(0.79%)	(0.65%)	(0.76%)	(1.31%)
Married	1,938	518	638	356	426
	(66.76%)	(17.84%)	(21.98%)	(12.26%)	(14.67%)
Divorced	863	197	327	151	188
	(29.73%)	(6.79%)	(11.26%)	(5.20%)	(6.48%)
Total	2,903	738	984	529	652
Educational Qualification:					
Technical/Professional	286	79	94	67	46
	(9.85%)	(2.72%)	(3.24%)	(2.31%)	(1.58%)
Bachelor's Degree	1,572	418	517	257	380
	(54.15%)	(14.40%)	(17.81%)	(8.85%)	(13.09%)
Master	704	132	304	108	160
	(24.25%)	(4.55%)	(10.47%)	(3.72%)	(5.51%)
PhD	341	109	69	97	66
	(11.75%)	(3.75%)	(3.38%)	(3.34%)	(2.27%)
Total	2,903	738	984	529	652
Working Experience:					
0-5 years	294	68	91	87	48
	(10.13%)	(2.34%)	(3.13%)	(3.00%)	(1.65%)
6-10 years	415	109	123	95	88
	(14.30%)	(3.75%)	(4.24%)	(3.27%)	(3.03%)
11-15 years	477	126	142	108	101
	(16.43%)	(4.34%)	(4.89%)	(3.72%)	(3.48%)
16-20 years	663	103	276	106	178
	(22.84%)	(3.55%)	(9.51%)	(3.65%)	(6.13%)

Variables	Total Sample	Country 1	Country 2	Country 3	Country 4
	(N)	Ghana	Nigeria	Togo	Burkina Faso
21 and above	1,054	332	352	133	237
	(36.31%)	(11.44%)	(12.13%)	(4.58%)	(8.16%)
Total	2,903	738	984	529	652
Specialization:					
Textiles	458	104	153	83	118
	(15.77%)	(3.58%)	(5.27%)	(2.86%)	(4.06%)
Tobacco	102	32	39	17	14
	(3.51%)	(1.10%)	(1.34%)	(0.59%)	(0.48%)
Automotive	403	115	122	71	69
	(13.88%)	(3.96%)	(4.20%)	(2.45%)	(2.38%)
Decorative items	283	69	93	58	63
	(9.75%)	(2.38%)	(3.20%)	(2.00%)	(2.17%)
Essential oils	102	21	39	24	18
	(3.51%)	(0.72%)	(1.34%)	(0.83%)	(0.62%)
Soap	143	43	58	19	23
	(4.93%)	(1.48%)	(2.00%)	(0.65%)	(0.79%)
Electronics	119	32	49	17	21
	(4.10%)	(1.10%)	(1.69%)	(0.59%)	(0.72%)
Aluminium	581	131	146	82	208
	(20.01%)	(4.51%)	(5.03%)	(2.82%)	(7.17%)
Printing	210	44	62	59	45
	(7.23%)	(1.52%)	(2.14%)	(2.03%)	(1.55%)
Cement	195	53	79	37	26
	(6.72%)	(1.83%)	(2.72%)	(1.27%)	(0.89%)
Beer brewing	107	29	53	12	13
	(3.69%)	(1.00%)	(1.83%)	(0.41%)	(0.45%)
Tomato Paste	116	45	59	32	20
	(4.00%)	(1.55%)	(2.03%)	(1.10%)	(0.69%)
Cosmetics	84	20	32	18	14
	(2.89%)	(0.69%)	(1.10%)	(0.62%)	(0.48%)

On the other hand, below statistics shows the summary description of the dataset taking into account the mean and standard deviation. On average, A.I has enhanced the way industry players effectively complete the task and product delivery at a weighted mean of 80.97 percent. This means that A.I has help improve efficiencies and augment our human capabilities with new products and processes in the manufacturing industry. Additionally, the use of A.I has facilitated good decision making process and also, build confidence in business transaction as a weighted average growth rate of 84 percent (approximately). Likewise, data management in artificial intelligence technology which saw a rate of 82 percent with its ability to stores lots of data in a structured electronic format. Moreover, the acquisition, installation and maintenance cost (fees) of the technological device together with its expertise support contributed equally to its usage with a weighted average of 78 percent and 80 percent respectively. On the basis of such device privacy protection scored an average figure of 73 percent approximately. Overall, the beneficial value of such technological device recorded a weighted average mark of 88 percent while respondents' reasons for adopting such artificial intelligence technology in their business operations had a 90 percent acceptance rate. In sum, this portray that A.I is an integral part of our business

system because it allows companies to design, produce and deliver products and service better than ever before. (Table no. 3)

Table no. 3. Descriptive Statistics

Total Sample (N = 2,903)				
Variable/Description				
Mean	SD	Min	Max	
Usefulness				
1. A.I enables quicker completion of tasks				
87.45	0.07	26.19	102.38	
2. A.I enhance my task effectively				
79.62	0.18	43.02	93.82	
3. A.I makes it easier to do my task				
81.09	0.24	31.93	119.39	
4. A.I improves my task performance				
76.13	0.06	54.28	96.94	
5. A.I save time and effort in performing task				
80.54	0.12	21.94	94.63	
Trust				
6. A.I has influence my business performance				
84.27	0.27	42.85	103.48	
7. A.I has impacted on my personal life				
73.16	0.43	51.94	97.03	
8. A.I has change operations in the industry				
82.43	0.05	40.48	110.32	
9. A.I facilitate good decision making				
90.18	0.24	53.95	100.53	
10. A.I build confidence in business transactions				
89.43	0.10	41.06	90.39	
Data				
11. A.I efficient in managing companies data				
78.05	0.29	38.12	94.65	
12. A.I ability to convert raw data into structured electronic form				
89.33	0.08	54.93	98.32	
13. A.I back-up storage device on working data				
81.92	0.11	29.01	103.28	
14. A.I collaborating software with other Apps.				
73.54	0.24	32.09	96.49	
15. A.I ability to deal with different versions of working data files				
86.32	0.31	21.85	94.85	
Experts				
16. Need a technical person / professional on board				
90.12	0.25	39.24	128.49	
17. Requires frequent practical training on its usage				
72.94	0.13	31.45	97.93	
18. Handle relations with technicians and specialists				
86.07	0.28	21.58	102.39	

19. Check compliance and technical report on usage	70.54	0.37	37.29	91.37
20. Ensure periodic update of the digital tool	81.32	0.15	45.02	95.83
Cost (Fee)				
21. A.I involves a lot of money to acquire it	84.03	0.54	54.39	95.43
22. A.I fee is reasonable / adequate	69.43	0.31	26.01	83.59
23. A.I functions justify its costs	73.91	0.18	49.29	91.38
24. A.I fee on maintenance, web servers and services	85.32	0.09	32.11	101.29
25. A.I cost of web design and/or software development	75.49	0.15	21.38	98.42
Privacy				
26. Guidance towards collection, storing and processing	86.03	0.13	28.74	93.63
27. Reports unauthorized entry of hackers	71.24	0.09	32.03	89.02
28. Software access reviewed and consumer access rights updated	69.43	0.17	21.47	92.48
29. Ability to grant access only authorized staff	73.04	0.05	32.75	91.04
30. Routine review of stored data on business transactions	65.16	0.13	53.94	85.34
Value				
31. There is value for money in terms of cost	83.95	0.38	30.48	92.48
32. There is value for money in terms of task performed	90.48	0.21	54.96	128.05
33. It is worthwhile because its saves time	93.23	0.13	23.04	97.39
34. Deliver good results in business transactions	81.09	0.19	41.38	90.06
35. Consumer and community value of its usage	89.37	0.15	32.95	94.17
Adoption				
36. Intend to use it forever	95.83	0.21	24.85	107.49
37. Plan to recommend to others	84.39	0.03	32.94	97.06
38. Intend to subscribe for latest tech. version	92.05	0.27	41.02	94.39
39. Laws and policies reasonable on the adoption process	87.75	0.18	31.94	101.83
40. Beneficial functions outperform the risk attached	90.26	0.12	29.02	98.72

Again, below table no. 4 shows the results of the multiple regression analyses. On the basis of analyzing the benefit of introducing A.I into commerce, for instance; A.I improves task performance across Ghana ($\beta=0.84$, $p\text{-value}=0.01$), Nigeria ($\beta=0.82$, $p\text{-value}=0.01$), Togo ($\beta=0.81$, $p\text{-value}=0.01$) and Burkina Faso ($\beta=0.88$, $p\text{-value}=0.01$) as significantly related to the usage of such technological tool. Hence, the acceptance of the proposed framework and H1 (see above Figure no. 2). Secondly, the other variables, namely trust and data management were both found to be significantly related to perceived value with an R-squared of Ghana (0.804), Nigeria (0.853), Togo (0.724) and Burkina Faso (0.705). Moreover, technical (experts) assistance on the use of A.I scored a significant mark of Ghana ($\beta=0.76$, $p\text{-value}=0.01$), Nigeria ($\beta=0.74$, $p\text{-value}=0.01$), Togo ($\beta=0.80$, $p\text{-value}=0.05$) and Burkina Faso ($\beta=0.79$, $p\text{-value}=0.01$). Likewise cost (fee) and privacy protection that recorded a similar digits of introducing artificial intelligence into commerce. Empirically, this supports H2, H3, H4 and H5 framework constructed (see above Figure no. 2). Finally, the value of A.I positively affects the adoption of such technological tool via its ability to deliver good results in business transactions at respective rate of Ghana ($\beta=0.85$, $p\text{-value}=0.01$), Nigeria ($\beta=0.80$, $p\text{-value}=0.01$), Togo ($\beta=0.73$, $p\text{-value}=0.05$) and Burkina Faso ($\beta=0.81$, $p\text{-value}=0.01$). Also, the total sample regression results in table no. 5 affirms the significant magnitude of introducing artificial intelligence into trade / commerce. Clearly, the result estimates shows that artificial intelligence is helping companies of all sizes and in all industries improve productivity and the bottom line at every stage of the business lifecycle from sourcing material to sales and accounting to customer service. With A.I, the study justifies that technology has become even more entangled into our daily existence, workplaces and society in which we operates.

Table no. 4. Summary Regression Results

						Ghana			
Nigeria		Togo		Burkina Faso		β	SE		
β	SE	β	SE	β	SE				
Usefulness									
1. A.I enables quicker completion of tasks									
***	0.91	0.14	***	0.80	0.08	**	0.82	0.12	***
2. A.I enhance my task effectively									
0.79	0.23	**	0.76	0.14	**	0.76	0.09	***	
3. A.I makes it easier to do my task									
0.85	0.10	***	0.81	0.06	**	0.87	0.08	***	
4. A.I improves my task performance									
0.82	0.09	***	0.81	0.12	***	0.88	0.13	***	
5. A.I save time and effort in performing task									
0.80	0.13	**	0.83	0.06	***	0.81	0.07	***	
Trust									
6. A.I has influence my business performance									
0.74	0.29	***	0.69	0.27	**	0.79	0.12	***	
7. A.I has impacted on my personal life									
0.79	0.11	***	0.75	0.09	**	0.67	0.08	**	
8. A.I has change operations in the industry									
0.90	0.08	***	0.79	0.12	**	0.80	0.24	***	
9. A.I facilitate good decision making									
0.82	0.23	**	0.81	0.15	**	0.82	0.05	**	

10. A.I build confident in business transactions	0.84	0.12	***
0.84 0.20 ** 0.65 0.08 ** 0.76 0.13 ***			
Data			
11. A.I efficient in managing companies data	0.80	0.10	**
0.86 0.13 ** 0.59 0.19 ** 0.71 0.16 ***			
12. Convert raw data into structured electronic form	0.79	0.27	**
0.76 0.21 ** 0.51 0.20 ** 0.84 0.20 **			
13. A.I back-up storage device on working data	0.83	0.09	
*** 0.70 0.09 *** 0.67 0.27 ** 0.80 0.18 **			
14. A.I collaborating software with other Apps.	0.80	0.29	**
0.82 0.05 *** 0.61 0.18 ** 0.69 0.12 ***			
15. Deal with different versions of working data files	0.79	0.12	**
0.89 0.07 ** 0.74 0.07 ** 0.81 0.30 **			
Experts			
16. Need a technical person / professional on board	0.71	0.25	**
0.69 0.15 ** 0.67 0.37 ** 0.65 0.27 **			
17. Requires frequent practical training on its usage	0.76	0.17	***
0.74 0.12 *** 0.80 0.23 ** 0.79 0.17 ***			
18. Handle relations with technicians and specialists	0.85	0.13	**
0.61 0.06 ** 0.72 0.18 ** 0.69 0.25 **			
19. Check compliance and technical report on usage	0.80	0.32	***
0.79 0.10 *** 0.62 0.34 ** 0.71 0.08 ***			
20. Ensure periodic update of the digital tool	0.85	0.23	**
0.81 0.23 ** 0.59 0.12 ** 0.82 0.14 **			
Cost (Fee)			
21. A.I involves a lot of money to acquire it	0.80	0.28	
*** 0.79 0.23 ** 0.89 0.39 ** 0.78 0.07 ***			
22. A.I fee is reasonable / adequate	0.82	0.23	
*** 0.80 0.49 *** 0.78 0.48 ** 0.59 0.32 ***			
23. A.I functions justify its costs	0.68	0.18	**
0.83 0.18 *** 0.83 0.36 ** 0.67 0.31 ***			
24. A.I fee on maintenance, web servers and services	0.71	0.12	*
0.89 0.27 * 0.76 0.23 ** 0.69 0.09 *			
25. A.I cost of web design and/or software development	0.69	0.09	
*** 0.72 0.12 ** 0.81 0.021 ** 0.71 0.26 ***			
Privacy			
26. Guidance towards collection, storing and processing	0.67	0.31	**
0.87 0.06 ** 0.69 0.19 ** 0.76 0.19 ***			
27. Reports unauthorized entry of hackers	0.77	0.32	
** 0.74 0.23 ** 0.83 0.28 ** 0.69 0.38 **			
28. Access reviewed and consumer access rights updated	0.80	0.23	
*** 0.80 0.11 ** 0.71 0.07 ** 0.55 0.29 **			
29. Ability to grant access only authorized staff	0.85	0.21	*
0.74 0.08 ** 0.76 0.43 * 0.80 0.08 *			
30. Routine review of stored data on business transactions	0.81	0.11	
** 0.76 0.39 ** 0.70 0.09 ** 0.68 0.15 *			
Value			
31. There is value for money in terms of cost	0.84	0.18	
*** 0.89 0.14 *** 0.85 0.29 ** 0.60 0.06 **			
32. There is value for money in terms of task performed	0.89	0.12	
*** 0.90 0.29 *** 0.82 0.11 ** 0.80 0.14 ***			
33. It is worthwhile because its saves time	0.91	0.10	
** 0.82 0.26 ** 0.79 0.37 ** 0.75 0.14 **			

34. Deliver good results in business transactions	0.85	0.14
*** 0.80 0.15 *** 0.73 0.19 ** 0.81 0.39 ***		
35. Consumer and community value of its usage	0.79	0.09
** 0.89 0.12 ** 0.67 0.24 ** 0.83 0.06 **		
Adoption		
36. Intend to use it forever	0.80	0.13
** 0.87 0.25 ** 0.80 0.13 ** 0.87 0.14 **		
37. Plan to recommend to others	0.79	0.10
*** 0.74 0.12 *** 0.78 0.09 ** 0.75 0.17 **		
38. Intend to subscribe for latest tech. version	0.81	0.09
** 0.68 0.09 ** 0.82 0.42 ** 0.86 0.23 **		
39. Laws and policies reasonable on the adoption process	0.90	0.21
*** 0.79 0.13 *** 0.71 0.08 ** 0.79 0.09 ***		
40. Beneficial functions outperform the risk attached	0.86	0.13
*** 0.84 0.11 *** 0.76 0.15 ** 0.81 0.12 ***		
F-Statistics (p-value)	71.05 (0.00)	
81.43 (0.00) 68.82 (0.00) 73.86 (0.00)		
R-squared	0.804	
0.853 0.724 0.705		
Adjusted R-squared	0.732	
0.798 0.691 0.672		
<hr/>		
Durbin-Watson	2.09	
1.98 1.86 2.05		
*p < 0.1; **p < 0.05; ***p < 0.01.		

Table no. 5. Overall Regression Results

Total Sample (N) = 2,903		
Variable/Description		
<i>beta</i>	<i>Standard Error</i>	
Usefulness		
1. A.I enables quicker completion of tasks		0.83
0.13 ***		
2. A.I enhance my task effectively		0.91
0.08 ***		
3. A.I makes it easier to do my task		0.90
0.23 ***		
4. A.I improves my task performance		0.86
0.11 ***		
5. A.I save time and effort in performing task		0.82
0.09 **		
Trust		
6. A.I has influence my business performance		0.80
0.21 **		
7. A.I has impacted on my personal life		0.84
0.07 ***		
8. A.I has change operations in the industry		0.93
0.13 **		
9. A.I facilitate good decision making		0.72
0.10 **		

10. A.I build confident in business transactions	
0.81	0.13 ***
Data	
11. A.I efficient in managing companies data	0.73
0.12 **	
12. Convert raw data into structured electronic form	0.86
0.05 **	
13. A.I back-up storage device on working data	0.83
0.17 ***	
14. A.I collaborating software with other Apps.	0.86
0.21 **	
15. Deal with different versions of working data files	0.74
0.14 **	
Experts	
16. Need a technical person / professional on board	0.84
0.15 **	
17. Requires frequent practical training on its usage	0.79
0.27 ***	
18. Handle relations with technicians and specialists	0.92
0.09 **	
19. Check compliance and technical report on usage	0.73
0.20 ***	
20. Ensure periodic update of the digital tool	0.88
0.07 **	
Cost (Fee)	
21. A.I involves a lot of money to acquire it	0.79
0.06 ***	
22. A.I fee is reasonable / adequate	0.86
0.21 ***	
23. A.I functions justify its costs	0.73
0.13 **	
24. A.I fee on maintenance, web servers and services	0.82
0.11 **	
25. A.I cost of web design and/or software development	0.79
0.04 ***	
Privacy	
26. Guidance towards collection, storing and processing	0.72
0.15 **	
27. Reports unauthorized entry of hackers	0.69
0.21 **	
28. Access reviewed and consumer access rights updated	0.88
0.29 ***	
29. Ability to grant access only authorized staff	0.83
0.03 **	
30. Routine review of stored data on business transactions	0.90
0.10 **	
Value	
31. There is value for money in terms of cost	0.76
0.23 ***	
32. There is value for money in terms of task performed	0.80
0.08 ***	
33. It is worthwhile because its saves time	0.86
0.20 **	

34. Deliver good results in business transactions	0.77
0.12 **	
35. Consumer and community value of its usage	0.81
0.09 ***	
Adoption	
36. Intend to use it forever	0.84
0.17 **	
37. Plan to recommend to others	0.76
0.22 **	
38. Intend to subscribe for latest tech. version	0.91
0.18 **	
39. Laws and policies reasonable on the adoption process	0.86
0.04 ***	
40. Beneficial functions outperform the risk attached	0.90
0.10 ***	
F-Statistics (p-value)	78.23
(0.00)	
R-squared	0.842
Adjusted R-squared	0.838
Durbin-Watson	2.29

*p < 0.1; **p < 0.05; ***p < 0.01.

In support of above regression test conducted to examine the direct effects of the seven hypothesis proposed including overall value of introducing artificial intelligence into trade/commerce. Below table no. 6 result affirms that value is significant at critical vale of 2.493 (p-value=0.009). Similar with the adoption use of technological tool at a statistically significant critical value of 3.072 (p-value=0.018). Likewise, all other benefits and sacrifice variables as shown below (see Table no. 5). However, the study conclude at accepting the seven hypothesis because perceived value reflects the overall comparison between benefit and risk (sacrifice) in the use of artificial intelligence into trade/commerce using West-African manufacturing and production companies as a case study.

Table no. 6: Pearson Chi-square

No	Variable	Critical Value	Asymp. Sig. (2-sided)
1	Usefulness	6.018	0.090
2	Trust	0.931	0.015
3	Data	2.485	0.032
4	Experts	5.013	0.006
5	Cost	4.485	0.028
6	Privacy	3.102	0.011
7	Value	2.493	0.009
8	Adoption	3.072	0.018

Conclusions

This paper explores the benefits and risks of introducing A.I. into commerce using the manufacturing and production companies in West-African as a case study. In order to achieve the goals, we identified key influencing factors that affect the companies' adoption based on value-based adoption model (VAM) using seven key number of hypotheses. Also, introduction of A.I. is a prerequisite for the adoption and proliferation of digital technologies into Commerce. According to the results, the seven variables were found to be significantly related to perceived value on the use of A.I. into trade/commerce. The findings of this study shows that with A.I technologies, companies can smartly and efficiently scan a lot of data. This business to customer (B2C) services help ease customer behavior by offering relevant solutions for each consumer. Moreover, manufacturing companies are now able to create shopper that assist customers online. Literally, this is similar to a physical store in real time that assist customers to purchase their products. Also, introducing A.I into commerce supports "round-the-clock" services. This means that there is 24/7 shopping services providing customers with assistance via the buying process. Furthermore, such technological introduction helps commerce industry predicts the shopping patterns based on what customer buy and when they buy them. Such A.I digital assistant, for instance, in the business-to-business (B2B) transactions are driving lots of innovative solutions. For example, A.I enables supply chain automation that enables effective management in respect to vendors, delivery schedules and market needs. On the other hand, the study affirms the proposed framework since A.I systems have the ability to learn and/or adapt as they make decisions, which in returns generates substantial economic and social benefits. Additionally, the results show how businesses are implementing A.I to improve retail standards, customer experience and revenue and fast delivery processing of commodities. For instance, the emergence of COVID-19 broke most of the transportation links and distribution in a global context as the world was hammered by one of the greatest interruptions in modern history. Nevertheless, the implications of the COVID-19 pandemic on A.I's future present opportunities for A.I to mitigate such canker through the provision of automated products manufacturing, distribution and sustainability. This, in turn, makes market places and streets less crowded and also, better support measures such as social distancing while performing business transactions online. This will go a longer way to increase the reactivity and resilience of complex global products supply chain. Moreover, A.I based predictive mechanism can help forecast customer demand, shortages and bottlenecks before they occur. Such A.I tool when deployed assist firms with manufacturing warehouses, distribution centers and consumer markets around the globe to predict pressure points and boldly shift their human resources and inventory levels to meet market demands. A.I does not require social distancing and may also offer attractive alternative for some tasks that were previously undertaken by human workers.

In a nutshell, A.I. has been deployed to enhance human activities. Moreover, this empirical study appreciates the significant role A.I. is playing as a leading mechanism in driving innovative solutions and customer experiences in areas such as personalized shopping, product recommendations, and inventory management.

The increasing penetration of A.I technologies into many aspects of business decision making processes raises lots of concerns and ethical issues. However, there is the need for A.I to observe every customer interaction related to the business. Future studies can be extended by examining other factors that could influence the adoption of A.I. into other

sectors of the economy and how to evaluate the rate of acceptance within the spheres of exchanging products for business purposes.

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