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Organizational Readiness and Intentions Toward Artificial Intelligence Adoption: Evidence from Bangladesh

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Abstract: Factors shaping the adoption intention of artificial intelligence (AI) in Bangladesh are investigated in this research paper by incorporating the TOE framework and DOI theory. The research aims to convey an in-depth understanding of institutional readiness for adopting AI by extending the TOE framework with digital literacy. A total of 197 samples were accepted as a valid response. A probability sampling technique called stratified sampling was incorporated in this paper. Additionally, a structured closed-ended questionnaire was presented to the targeted sample especially located in the head office and divisional office. The data were inspected by SmartPLS 4.0. The findings indicate that all hypotheses, except government support, significantly impact AI adoption intention in Bangladesh. To offer an enriched understanding of AI adoption, the outcomes enrich existing literature and framework by bringing human attributes and environmental elements into consideration. For the policymakers and business pioneers who are working to aid AI implementation in emerging markets, this paper provides worthy and real-world insights for them.

Keywords: digital literacy, government support, artificial intelligence, DOI, TOE

1. Introduction

AI is described as "a set of instruments and technological capabilities able to supplement and improve organisational functioning" [1]. The rise of AI has led programming and system developers to create innovative ways to increase income, cut costs, and improve an organization's efficiency [2]. By automating monotonous jobs, simplifying procedures, and generating knowledge via data analysis, AI has an opportunity to greatly enhance enterprises in Bangladesh [3]. AI-enabled chatbots can be utilized for dealing with clients, and systems built upon AI can be harnessed in the retail segment to forecast customer appetite and optimize stock control [4]. AI is continuously contributing to several areas of Bangladesh such as human resource management, higher education, FinTech, smart farming, banking, health professionals, mobile apps, journalism, talent hiring, healthcare sector, and so on [3–11].

The evolution of artificial intelligence (AI) serves as the elevator of digital transformation and the key role player in business automation. It supports human–machine collaborations and ensures a real-time, continuous, dynamic, and flexible decision-making process in a challenging business environment [12]. AI is an emerging driver of digital transformation, working like human intelligence with a capacity to think critically, analyze data, and solve problems [13]. AI offers improved processes with a wide range of segments, fostering rapid decision-making with no bias. It has the excellence capacity in decision-making by collecting and analyzing real-time data in a second. Ultimately, it increases organizational efficiency with virtual assistance that saves time and money [14].

Therefore, AI in business continues to expand, and businesses in Bangladesh initiate embracing this latest innovation in order to strengthen their services and to preserve their position on the global stage [4].

Thus, [6] recommended that smart farming, enabling accountable leadership along with AI and IoT-based tech, will enable viable farming in Bangladesh. Recently, a lot of educational institutions have also started utilizing AI technology to plan and carry out effective, excellent classes as well as possible educational endeavors [15]. An AI-based study aid directs pupils to relevant material, gives them feedback on areas for improvement and helps them in comprehending their assignments without aid from a professional instructor [8]. A recent study indicated that university students of Bangladesh are also willing to adopt AI,

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but due to the lack of expertise, sometimes they show apathy to it [15]. Furthermore, AI is becoming a growing trend among hiring managers because it may take out of many recruitment and interviewing processes when hiring people. AI efficiently aids in the recruitment of personnel for industrial and service enterprises in Bangladesh [16]. Conversely, to boost production and competitiveness, the Ready-Made Garments (RMG) sectors are welcoming AI, since it mitigates labor expenditure. AI may benefit Bangladeshi businesses by streamlining procedures. Also, AI solutions help retail businesses save money and improve logistical performance by analyzing sales data, estimating client demand, and optimizing stock [4]. Now, the financial sector, such as banks, is constantly seeking methods to integrate modern technology into their operations in order to increase productivity and speed of service. Bangladesh Bank's Information Systems Development and Support Department released an announcement concerning the employment of AI in the banking sector, and a survey that found 29% utilize AI in some context [8]. Additionally, AI presents an opportunity for financial firms to embrace these technologies' indications [17]. As far as research, AI has the ability to reduce scams and enhance credit risk evaluations [18]. Another sector in Bangladesh that could profit from AI is retail. AI-enabled chatbots can make sure efficient client satisfaction and respond to frequently requested questions.

AI has the capability to redesign the healthcare diagnosis and treatment system. AI-powered systems are capable of analyzing MRIs, CT scans, and X-rays, among other medical pictures, enabling quicker and more precise disease diagnosis; to aid with the choice of therapy, AI may also predict results for patients [4]. It is able to estimate patient outcomes, detect ailments, and analyze medical images [4, 11]. AI is being used by Bangladesh's transport and tourism sectors to cut expenses, boost output, improve services, and boost visitor familiarity, all of which will contribute to a successful future [3]. Moreover, [4] identified that customer segmentation, content development, and campaign optimization in marketing are highly dependent on AI. He also added that renewable energy management and defect detection in the energy sector might benefit from AI. So based on the above studies, we may conclude that none of the organizations of Bangladesh would skip the AI, if they wish to sustain in the era of Fourth Industrial Revolution (4IR).

Though Bangladesh is witnessing a rapid acceptance of AI in different sectors, it is still in its early stages. The global report says that 72% of organizations adopt AI for at least one of their business functions and only 8% adopt it for 5 or more functions [19]. For instance, [7] used the Unified Theory of Acceptance and Use of Technology (UTAUT) framework to explore the components driving the use of AI in the recruitment process. Similarly, [20] pinpointed the factors driving Bangladeshi professionals' intention to adopt ChatGPT, while [15] showed that AI is advantageous for university students through the lens of UTAUT predictors. Generally, chatbots are used to respond to predefined common questions (frequently asked questions) by users, but [21] reveals that AI-driven chatbots can be incredibly helpful to users by responding with immediate personalized answers. Despite the concerns about data accuracy, the availability of information, rapid data processing speed, and time efficiency encourage the adoption of AI in education and research [22]. Likewise, to move the discussion beyond individual-level adoption, the present research draws on the technology–organization–environment (TOE) framework and Diffusion of Innovation (DoI) theory, both of which evaluate AI uptake at the organizational level and thus promise fresh insights for Bangladeshi Firms. The DoI theory, which is frequently utilized as the theoretical basis for the adoption of AI, covers the significant components of invention, adopters, and ways to connect [23]. The TOE framework examines organizational, technological, and environmental contexts that influence innovation adoption at the firm level. In this study, we investigate an eternal variable, namely, technology export into the DOI theory, recognizing that less developed countries like Bangladesh often rely heavily on technology transferred from more developed nations. In addition, we extended the TOE framework by incorporating digital literacy (DL) to better understand the factors shaping AI adoption intentions within Bangladeshi organizations.

Based on the previous study's gap, this paper aims to fulfill the following objectives.

1) To discover the antecedents that generate AI adoption intention in Bangladeshi business and service organizations, based on the TOE framework and DOI theory.
2) To analyze the effect of DL as an extended component of the TOE framework.
3) To forecast the support of the government to adopt AI in Bangladesh.

2. Literature Review and Hypotheses Development

The adoption of AI in Bangladesh is in its initial era. The government, autonomous, and private institutions are investing money to adopt AI in their business and services. The previous study revealed that proper policy, data privacy, security, and government regulation can foster AI adoption in various sectors in Bangladesh [3]. [7] demonstrated that the elements of the UTAUT2 model positively impact the AI-based technologies in recruitments in South Asia. [20] revealed that the adoption of ChatGPT is strengthened by the performance benefits, trust, and facilitating conditions that ultimately generate Behavioral Intention (BI) among professionals. Besides, there is a strong correlation among variables of the UTAUT model and AI use intention of university graduates [15]. Moreover, the Bangladeshi education system has already started to utilize augmented reality, virtual reality, and AI for ensuring students' progress. Supporting the statement [24] demonstrates that the intention to embrace AI among Bangladeshi learners is positively impacted by effort expectancy, performance expectancy, facilitating conditions, risk aversion, DL, and government backing.

On the other hand, it was found that Al can enhance the sustainability in higher education [10]. Moreover, AI helps to accept the latest technology in higher education particularly in private and public sectors [9]. Bangladesh has a long history of farming; therefore, smart farming is a mandatory fact in this digital era. Thus, by the new invention and interoperating technology, AI helps to promote smart farming in Bangladesh [6]. Bangladesh also aimed to achieve Sustainable Development Goals (SDGs) within the timeframe. Likewise, Islam et al. [4] said that to achieve the sustainable goal in numerous areas such as agriculture, waste management, water management, heating, and ventilation management, AI plays a greater role. The banking sector is also highly dependent on AI nowadays to secure transactions and customer satisfaction [8].

2.1. Technology–organization–environment (TOE) framework

This research, aside from the prominent theories such as the Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and UTAUT, actually evaluates personal

decision-making strategy [25]. According to the TAM, individuals are more likely to adopt a new technology that is simple to use and beneficial [26]. However, a theoretical framework for examining how innovative technologies are adopted by organizations is supported by the TOE framework [27]. The tech uptake choices of organizations are shaped by the interactions of technology attributes, organizational variables, and environmental impacts. The TOE framework explicates the behavioral intentions and adoption of three aspects: emerging technologies, organizational conditions, and industry environment. The technological context reflects a firm's existing and emerging technologies; the organizational context reflects the firm's size, resources, and scope; and the environmental context describes the business arena [28].

Aiming for resilient and sustainable business performance in Saudi Arabia, Small and Medium Enterprises (SMEs) are adopting AI that integrates the TOE framework to identify the most relevant aspects, which are being investigated and presented [25]. [29] technological compatibility (TC) and organizational readiness (OR) of TOE positively impact professionals' ability to implement AI in the accounting and audit sectors. A study showed that the variables of TOE impact AI adoption in public sectors [30]. It has been used in the adoption process of many technological innovations such as eCRM, [31], blockchain tech [32, 33], and cloud computing [34].

Therefore, this paper assimilates organizational preparedness, technological compatibility, and government support (GS) as the components of TOE to explore the direct impact on AI adoption intentions in Bangladeshi organizations. Here, the degree to which the implementation of a particular technical remedy aligns with the requirements of the industry where it is deployed is known as technology compatibility [29]. To bring novelty to the paper, we extended the TOE framework with a vital component that is a must-needed factor in the process of adopting AI in Bangladesh, namely, DL, which means technological, cognitive, and sociological abilities of a person [35]. We extended this variable from the technological point of view. Finally, this investigation contributes in two ways. First, it explores how extended TOE features affect AI adoption directly. Second, compared to earlier research, it offers a more thorough assessment of the constructs impacting AI adoption and delves deeper into the ways that AI adoption choices would impact business and service organizations in the context of Bangladesh.

2.2. The Diffusion of Innovation theory (DOI theory)

The DOI theory looks into how to integrate cutting-edge technologies into social processes [36]. Relative advantage, compatibility, observability, trialability, and perceived complexity are some of the elements that are involved, and they can all have an impact on how effectively organizations adopt technology [37]. This theory's lack of attention to other aspects, such as organizational or environmental variables, is one of its drawbacks [36]. Consequently, the present investigation integrates the noteworthy element of the rate of technology adoption to build a distinct framework that can explain these views from a macro perspective. This paper assimilates the perceived compatibility and trialability in this paper. Perceived compatibility (PC) refers to the extent to which society is willing to embrace AI applications and technologies, even when these innovations may conflict with users' existing expectations, prior experiences, or current values [23]. Oppositely, trialability reflects the degree to which individuals and communities are open to experimenting with new technologies [38, 23]. It assesses whether potential adoption is encouraged based on users' evaluation of desirability and practical benefits of AI technologies and applications [39].

2.3. Organizational readiness (OR)

Organizational readiness (OR) plays a vital role in the successful implementations of AI technologies [40]. It refers to the readiness of an organization to leverage AI, encompassing factors such as infrastructure, institutional culture, and operational processes [41]. Beyond technical preparedness, the competency of human resources proactively impacts the transformation process associated with AI [40]. Moreover, being change ready is essential prior to initiating such transformations [42]. Consequently, a high OR encourages an atmosphere of constant enhancement by coordinating AI deployment with corporate strategy, effective supervision, strong data handling skills, technical framework cooperation, and talent growth [41]. Previous studies ascertained that OR is a significant element in AI adoption in numerous sectors, for instance, SMEs [43], organizations and enterprises [40], and corporations and enterprises [2].

By utilizing the TOE framework, [44] concluded that OR meaningfully impacts perceived usefulness to adopt AI in manufacturing and production firms. However, [45] adopted TOE framework and revealed that OR is not significant to adopt AI. So rooted in the previous arguments, we formulate the hypothesis.

H1: Organizational readiness (OR) is positively related to AI adoption intention in Bangladesh.

2.4. Technological compatibility (TC)

Compatibility has a favorable impact on the uptake of novel concepts [34], [27]. Besides, greater compatibility results in more acceptance of AI [40]. AI setup will probably be quicker and cheaper if it is compatible with current IT configurations [2]. Thus, technological compatibility (TC) can lead to a higher level of AI adoption intention. Previous studies found a notable effect of TC on the adoption of Al such as at organizations and enterprises [40], corporations and enterprises [2], SMEs' business performance [25], and accounting and audit firms [29].

Using the TOE framework, [46] examined the AI adoption in corporate IT network operations and found that TC positively impacts the operational productivity of the network. [47] investigated AI adoption intention at the organizational levels based on the TOE framework and found a satisfactory impact of technological compatibility on AI adoption intention. [48] linked technological compatibility as a decisive element in the adoption of AI in production. Based on the evidence, we hypothesize that

H2: Technological compatibility (TC) is positively related to AI adoption intention in Bangladesh.

2.5. Perceived compatibility (PC)

PC refers to the extent to which a new concept connects with existing corporate policies, procedures, and appraisal structures. Compatibility facilitates the corporation's strength [49]. Individuals are more fascinated to embrace innovation if they believe it can fulfill their needs and complement their experiences [36].

Previous studies found that PC has directly influence on technology export. For instance, [36] stated compatibility as having a favorable impact on technology export as AI applications are adopted in virtual educational contexts. Additionally, [23]

concluded that PC has affirmatively exerted on the technology export, which ultimately results in the adoption of AI applications in the education segment. Valuing evidence, we may formulate the following hypothesis:

H3: Perceived compatibility (PC) positively impacts on technology export.

2.6. Trialability (TR)

Trialability (TR) refers to how much the community accepts innovations [36]. Besides, trialability is the extent to which instructors motivate learners to employ AI tools and apps in the future [38, 50]. Moreover, trialability gauges the extent to which potential applications are promoted and fostered based on learners' assessments of the desirability of AI technology and apps [39].

Trialability is the major component of the impact of technology export in any nation. Studies found that TR has a positive impact on the technology export of AI in the virtual education context [36] and in education apps [23]. Furthermore, the public's acceptance of AI-based autonomous vehicles is positively impacted by trialability through the mediating role of perceived value. So based on the evidence, we formulate the given hypothesis:

H4: Trialability (TR) is positively impact on technology export.

2.7. Technology export (TE)

Nations are experiencing a trend toward the kinds of innovations classified as high-technology exports, in which new innovations are created in wealthy regions and then disseminated to less developed nations [23, 36]. Therefore, nations that are not as proficient with an invention and its dissemination are considered adaptive [51]. Previous studies also found TE as a satisfactory variable regarding AI adoption in the government sector of the Gulf area [36] as well as AI adoption for educational reasons in the UAE [23]. Bangladesh is in its initial stage of AI adoption; therefore, we proposed the given hypothesis:

H5: Technology export (TE) is positively related to AI adoption intention in Bangladesh.

2.8. Digital literacy (DL)

Humans must employ a variety of technological, cognitive, and sociological abilities to carry out jobs and address issues inherent in the digital age according to the explosive growth of electronic devices. Academics refer to these abilities as "digital literacy" [35]. DL includes digital transformation skills, digital tool proficiency, and information skills. Recently, [52] described DL with skills such as software/app use, smartphone use, safeguarding privacy, moral conduct, and individual inventiveness and compassion. It means that DL has several dimensions related to using new technology such as AI. Additionally, [53] described the skills required to embrace and deploy AI technology. In his study of the idea of AI and its advancements, [54] examined life, business, employment trends, and societal problems brought on by these developments.

Previous studies found that DL has a significant impact on digital technology/AI adoption intention in various sectors. For instance, [55] demonstrated that attitudes toward using digital technology at work are influenced by DL levels in an indirect way. [53] discovered how well DL affected college students' opinions on AI technologies. Additionally, the perceived value and usability of AI in education are linked to DL, and this affects SPED teachers' intention to employ AI in education [56]. Therefore, we determined to explore how DL impacts on AI adoption intention. Thus, grounded in facts, we formulate the following hypotheses:

H6: Digital literacy positively impacts AI adoption intention.

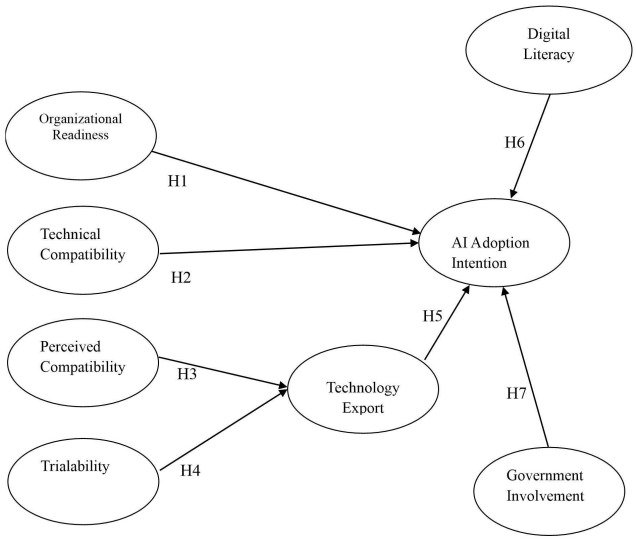
2.9. Government support (GS)

In order to foster IT advancement, government engagement is essential [57]. Additional rules for the growth of new technologies alongside encouraging tactics and guidelines could be put in place by the governing bodies [40]. Because without governmental support, the exchange of technology such as AI is impossible for a least developed country. [40] found that government involvement or support directly impacts AI adoption at the Vietnamese organizational level. Therefore, our paper looks into the direct effect of GS on AI adoption intention in Bangladesh. Thus, we proposed the following hypothesis:

H7: Government support positively impacts AI adoption intention.

Figure 1 demonstrates the relationships among variables based on the hypotheses integrated in this research.

Figure 1
The conceptual model



3. Research Methodology

3.1. Data and sample

There were two sections to the survey questionnaire form. The questionnaire form's first section asked the standard sociodemographic questions to characterize the sample profile, including age, gender, income, educational attainment, and so on. A total of 30 assertions were provided in the second section. With the aim of mitigating any suspicion about linguistic inconsistencies and the clarity of each statement, pilot research with 10 experts was first carried out to validate the questionnaire form. The questionnaire form was further enhanced in response to the

comments received. During February 2025 to July 2025, the data were collected from various organizations such as agricultural organizations, banking and finance, construction, education, energy and utilities, healthcare, information technology, manufacturing, retail, and transportations and logistics. We distributed 250 questionnaires, but due to the missing values and wrong responses, we excluded 53 responses.

3.2. Sampling techniques

The stratified sampling technique is utilized in this paper. Stated by [58], stratified sampling is the mechanism of splitting the delegates into clusters, or strata, and then picking a sample individually from each stratum. When a random sample is selected from each stratum, the process is established as stratified random sampling. Similarly, we investigate AI adoption intention in Bangladesh by dividing our target population into different groups or strata (such as organizations) and then collecting data from each stratum separately. What was not overlapping and together comprise the whole population. Stratified sampling generally yields more accurate estimates than unstratified sampling [58].

3.3. Questionnaire design

The 30 measurement items were collected from previous studies but amended according to our research objectives. Multi-item Likert-type 5-point scales were employed to gauge the constructs. Because it makes answering easier than using seven Likert scales, we favored the 5-point Likert scale over the 7-point Likert scale [59]. Table 1 presents the constructs, items, and source of the questionnaire.

4. Data Analysis

PLS-SEM, or partial least squares structural equation modeling, was used in the data analysis of this particular investigation

Table 1
Questionnaire development and sources

Constructs	Items	Source
Perceived compatibility (PC)	PC1: AI technologies are compatible with the latest organizational structure PC2: AI technologies are compatible with the learning approach and teaching tactics PC3: AI technology is not conforming to the latest institutional framework PC4: AI fits well with a changing organizational environment	[36, 50]
Trialability (TR)	TR1: AI technology offers potential applications in the future TR2: AI technology aids in predicting upcoming organizational/institutional tasks TR3: AI is innovative since it offers the likelihood to have detailed materials in institutional parameters TR4: Before we adopt AI, we would like to receive training or attend a course on using AI	[36, 50]
Technology export (TE)	TE1. Though it was discovered in another soil. AI satisfies the societal and institutional needs TE2: AI's innovative attributes are highly demanded at the corporation set up TE3: AI technology does content the desire of academician	[51]
Organizational readiness	OR1: The organization is ready to allocate budget for embracing AI in the organization OR2: The management and workforce are willing to adopt AI technology OR3: The organization is open to accept new AI technology OR4: The technological foundation of the organization is updated to adopt AI technology	[60, 61]
Technical compatibility	TC1: The usage and operation of AI is convenient to the organization TC2: Adoption of AI at the organizational level could add value in regular activities TC3: AI can integrate with the existing activities and technology without major changes TC4: AI ensures the security of large-scale organizational connections and data processing	[60, 62, 63]
Digital literacy	DL1: Personnel of the organization skilled in fixing their technical problems DL2: Workers have the technical expertise that is mandatory to harness digital technologies (AI) for working/learning DL3: Personnel are confident in searching and evaluating various information from websites DL4: Workers keep face with new digital technologies	[55]
Government involvement	GI1: Government provides financial support (subsidies) for adopting AI GI2: Government affords technical aids for adopting AI GI3: Government equips aid in tutoring manpower with AI technologies GI4: Government ensures the bank loans to finance the AI adoption activities at the organizational level	[25]
AI adoption intention	AAI1: My institution is desiring to adopt AI to upscale firm outcome AAI2: Institutions are ready to elevate the organizational platform and prepare to embrace AI AAI3: Institutions are ready to modernize their technological activities with AI	[25, 64]

using SmartPLS [65]. An assessment method consisting of two steps was used to gather the data. Both a measuring model and a structural model are part of this strategy [66]. PLS-SEM was selected for the present study for several reasons, which are listed in the report. The first factor that needs valuing is the examination of the conceptual theory put out in the present investigation, which is well suited for PLS-SEM [36]. The following point is that PLS-SEM manages investigation into conceptual models [67]. The third argument is that we may analyze the whole model as a single unit instead of breaking it apart by using the PLS-SEM [68]. The last justification is that, by relying on the PLS-SEM, we can obtain a simultaneous analysis of the structural and measurement models. The precision of the measurements that PLS-SEM can produce is what makes it significant [69].

4.1. Convergent validity

[66] proposed the constructs of validity (including discriminant and convergent validity) and reliability (including Cronbach's alpha (CA) and composite reliability (CR)) for scrutinizing the measurement model. In order to estimate construct dependability, Table 2 demonstrates that CA fall between 0.785 and 0.871. Besides, the CR value falls between 0.767 and 0.899. Additionally, the values of average variance extracted (AVE) fall between 0.506 and 0.654. The accuracy of the data is demonstrated by the fact that the CR value for each paradigm is higher than the cut-off value of 0.7 and the AVE is higher than the suggested threshold of 0.5 [70]. Every item loading is far greater than (between 0.537 and 0.925) the cut-off point of 0.5 [71]. These

Table 2
Convergent validity result

Constructs	Items	Factor loadings	Cronbach's alpha	Composite reliability (rho_a)	Compsite reliability (rho_c)	Average variance extracted (AVE)
Adoption of artificial intelligence (AAI)	AAI1	0.661	0.799	0.811	0.809	0.587
	AAI2	0.799				
	AAI3	0.829				
Digital literacy (DL)	DL1	0.643	0797	0.832	0.0868	0.626
	DL2	0.830				
	DL3	0.796				
Government involvement (GI)	GI1	0.810	0.785	0.837	0.846	0.585
	GI2	0.844				
	GI3	0.825				
	GI4	0.538				
Organizational readiness (OR)	OR1	0.678	0.788	0.865	0.810	0.516
	OR2	0.692				
	OR3	0.765				
	OR4	0.735				
Perceived compatibility (PC)	PC1	0.841	0.871	0.877	0.800	0.506
	PC2	0.814				
	PC3	0.711				
	PC4	0.734				
Technological compatibility (TC)	TC1	0.925	0.790	0.843	0.899	0.556
	TC2	0.770				
	TC3	0.812				
	TC4	0.832				
Technology export (TE)	TE1	0.809	0.843	0.876	0.767	0.525
	TE2	0.662				
	TE3	0.695				
Trialability (TR)	TR1	0.728	0.786	0.798	0.793	0.654
	TR2	0.705				
	TR3	0.703				
	TR4	0.660				

Source: Authors' own work based on PLS output.

findings support the construct's dependability, and each construct was finally deemed error-free.

4.2. Discriminant validity

The research goal was to assess discriminant validity. Therefore, it was proposed that we look at two criteria: the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio. Using [72] criteria, the suitability and adequacy of discriminant validity are evaluated. The criterion of [72] required that the correlations of the latent constructs (off-diagonal values) be less than the square root of AVEs (diagonal values). All constructs have discriminant validity, as shown by the results in Table 3.

4.3. Structural model and hypothesis testing

Six of the seven hypotheses were approved, while government involvement in AI adoption intention was rejected. The structural model was reviewed using the path coefficient (β values) and t values. The following table (Table 4) shows the outcome.

The results in Table 4 and Figure 2 demonstrate that a positive and significant relationship exists between most of the variables and AI adoption intention. Here, OR ($\beta = 0.475$, $t = 7.352$, $p < 0.05$), technological compatibility ($\beta = 0.310$, $t = 4.238$, $p < 0.05$), and DL ($\beta = 0.321$, $t = 3.290$, $p < 0.05$) significantly impact AI adoption intention in Bangladesh. Additionally, PC ($\beta = 0.246$, $t = 4.320$, $p < 0.05$), and trialability ($\beta = 0.411$, $t = 6.535$, $p < 0.05$) positively impact on technology export. Subsequently, technology export ($\beta = 0.138$, $t = 5.876$, $p < 0.05$) also significantly impact on AI adoption intention in Bangladesh. Finally, compare to early hypothesis government involvement is found insignificant on AI adoption intention with value of ($\beta = 0.028$, $t = 0.385$, $p > 0.05$).

5. Discussion and Implications

5.1. Discussion

The paper's conclusions offer important new information on the complex variables affecting AI adoption intentions in Bangladesh, especially when viewed through the prisms of the TOE and DOI frameworks. The beneficial effect of organizational readiness on the intention of employing AI highlights how important internal competencies are for enabling technology integration. This is similar to the insights of [73], who found that organizational readiness, which includes elements like resource availability and leadership commitment, is essential for implementing novel innovations like AI and data analytics in Bangladesh's textile and apparel sector. The favorable effect of technological compatibility suggests that organizations are more willing to adopt AI systems when these technologies align well with their existing infrastructure. This supports the findings of [74], who noted that in Bangladesh's garment industry, the perception of compatibility greatly influences technology adoption decisions. Additionally, the findings that DL boosts the intention to adopt AI highlight the vital role of human capital in technological development. As companies in Bangladesh explore AI integration, the digital proficiency of their employees becomes a critical factor. This is consistent with [75] research that stressed the fruitfulness of strengthening digital skills to ensure the successful implementation of Industry 4.0 technologies in the country's industrial sector.

The findings of the study reveal that, within the DOI framework, perceived trialability and compatibility significantly influence the perceived technical impact of AI, thereby encouraging Bangladeshi industries to adopt such technologies. This highlights the importance of businesses viewing AI as a natural

Table 3
Discriminant validity (Fornell and Larcker)

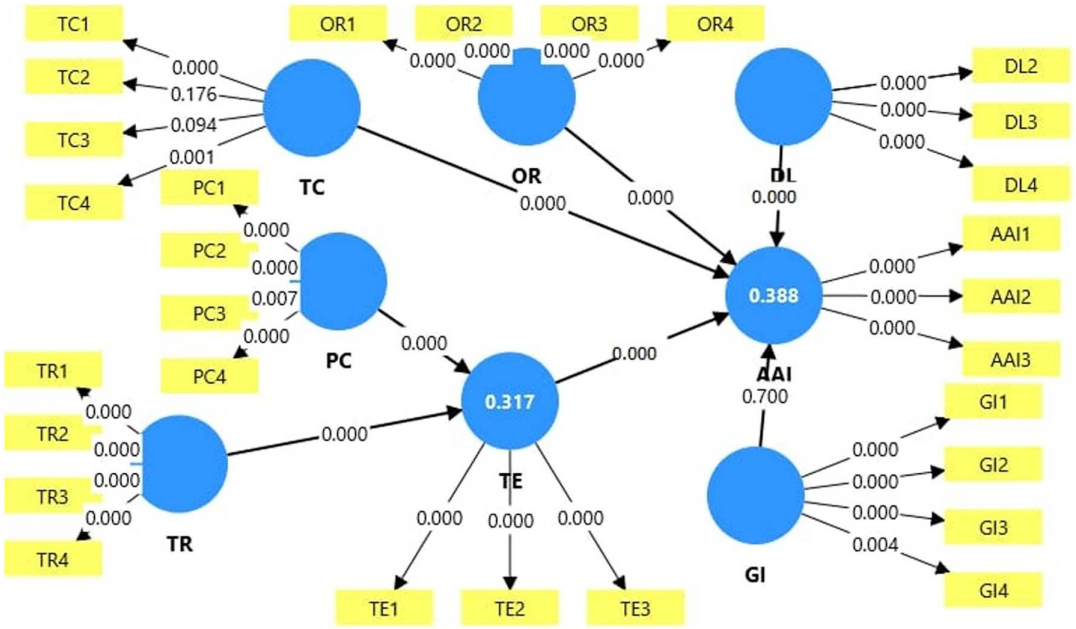
	AAI	DL	GI	OR	PC	TC	TE	TR
AAI	0.766							
DL	0.295	0.791						
GI	0.197	0.428	0.765					
OR	0.546	0.462	0.318	0.719				
PC	0.304	0.439	0.24	0.415	0.711			
TC	0.429	0.374	0.138	0.269	0.32	0.765		
TE	0.294	0.594	0.212	0.352	0.425	0.398	0.725	
TR	0.39	0.381	0.16	0.27	0.436	0.289	0.518	0.699

Source: Author's own work based on PLS output.

Table 4
Results of structural model and hypothesis testing

Hypotheses	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	p values	Result
H1: OR -> AAI	0.475	0.472	0.065	7.352	0.000	Accepted
H2: TC -> AAI	0.310	0.335	0.073	4.238	0.000	Accepted
H3: PC -> TE	0.246	0.255	0.057	4.320	0.000	Accepted
H4: TR -> TE	0.411	0.418	0.063	6.535	0.000	Accepted
H5: TE -> AAI	0.138	0.144	0.083	5.876	0.000	Accepted
H6: DL -> AAI	0.321	0.302	0.076	3.290	0.000	Accepted
H7: GI -> AAI	0.028	0.044	0.072	0.385	0.700	Rejected

Figure 2
Structural model (Source: Smart PLS outcome)



fit within their existing operations, values, and workflows rather than as something unfamiliar or disruptive. Prior research also supports the linkage, showing that PC helps reduce both operational and psychological resistance to new technologies. For instance, [44] found that employees are more likely to use an AI-enabled customer relationship management system when they believe these tools align well with their routine tasks. This suggests that organizations should position AI as a seamless enhancement to their current practices, not just a novel innovation. Besides, trialability allows companies to experiment with AI tools on a limited scale, helping reduce uncertainty and build confidence in their use. [76] reported that the ability to test mobile AI services enables Tanzanian manufacturing SMEs to better understand the benefits and limitations, leading to higher adoption rates. [77] described AI is capable to learn and adapt like humans. It incorporates technologies for excellence decision-making and helps managers to operate and accomplish a multidisciplinary operational process.

A key finding of the study is that GS does not have a significant impact on AI adoption intentions, suggesting a potential misalignment between policy-level initiatives and the practical realities faced by industries in Bangladesh. Despite the presence of regulatory frameworks, their actual effectiveness in driving AI adoption appears limited. This is consistent with [75], who noted that government regulation often lacks the necessary implementation mechanisms to facilitate meaningful technological advancement. This deviation is due to a lack of understanding or awareness supported by the government or weak policy; subsequently, the proposed hypothesis (H7) was not supported.

5.2. Managerial implications

The result of the study carries several actionable insights for practitioners and organizational leaders. First, the role of OR, including digital infrastructure and employee capability, is shown to be pivotal in fostering AI adoption. Managers should prioritize investments in technical training, change management processes, and systems integration to reduce internal resistance and enhance absorptive capacity. Second, the strong influence of top management support implies that AI adoption must be championed from the top. Senior executives should demonstrate strategic commitment by allocating necessary resources, setting a clear vision for AI implementation, and embedding digital transformation goals into the broader organizational strategy. Third, environmental pressures, particularly competitive intensity and regulatory environment, emerge as significant motivators for adoption. Managers are encouraged to monitor industry trends and governmental policies actively, leveraging these external forces as justification for proactive AI investments. Organizations operating in highly regulated or customer-centric industries may benefit from customizing their AI strategies to align with specific sectoral needs. Finally, the perceived complexity of AI technologies remains a major barrier. To overcome this, firms should consider phased implementation approaches, collaborate with technology vendors, and initiate pilot projects to build confidence and demonstrate values. Creating cross-functional AI teams and communities of practice can further ease the learning curve and foster a culture of innovation.

5.3. Theoretical implications

This investigation offers several significant contributions to the existing body of knowledge on technology adoption, particularly in the context of emerging economies. First, by integrating the TOE framework with the DOI theory, the research provides a more holistic understanding of organizational intentions toward AI adoption in Bangladesh. Second, another value-added contribution is to extend the TOE framework with digital literacy. It reflects organizational readiness to adopt AI definitely depends on technological availability and resources but employee's digital literacy is a crucial factor to foster the adoption ration. Then the application of this framework in the context of Bangladesh contributes to addressing the geographic and contextual gaps in the innovation adoption literature, which remains heavily

skewed toward developed countries. Third, the study incorporates technology export in DOI theory and linked among perceived compatibility, trialability with AI adoption intention. It refers organization shows interest to adopt those technologies that fit existing practices and can be verified before full execution. Finally, the insignificance of government support highlights that organizational strength and technological backup are more influential than external support in escalating AI adoption intention.

6. Limitations, Future Research Directions, and Conclusion

6.1. Limitations and future research directions

This study has a number of drawbacks that should be noted despite its contributions. First, the results cannot be applied to all sectors of Bangladesh due to the sample size of 197, especially to organizations that might not have been fairly represented even with the stratified sampling technique. Second, given the short time frame for data collection, temporal biases would have been introduced, resulting in a snapshot of organizational attitudes that might have missed changes over time, particularly in a rapidly changing subject like AI. Third, although sectoral variety was ensured through stratified sampling, the study is still limited to Bangladesh, and the results might not be applicable to other emerging nations due to institutional or cultural differences. Lastly, the study's capacity to explain how adoption intentions become actual implementation over time is limited by the cross-sectional design, which makes it challenging to identify causal correlations or long-term adoption patterns.

Expanding upon these constraints, a number of avenues for further investigation become apparent. First, in order to improve the generalizability of results and guarantee that underrepresented groups are sufficiently represented, future research should think about utilizing larger and more varied samples from other sectors and geographical areas. Future research should adopt a longitudinal design to track how AI adoption intentions evolve into actual implementation over time. Comparative studies across countries can also reveal how institutional, cultural, and regulatory factors shape the influence of DOI, TOE, and supporting elements like GS and DL. Additionally, exploring moderators or mediators such as organizational culture, leadership support, or perceived risk could offer deeper insights into AI adoption in developing countries.

6.2. Conclusions

The study applied the TOE framework and DoI theory to explore the factors influencing AI adoption intention across various sectors in Bangladesh. The findings reveal that while GS does not significantly influence intention, factors such as OR, TC, DL, PC, and TR positively influence adoption. This result indicates that internal organizational capabilities and perceived fit of innovation are more critical drivers than external policy support. On the other side, in Bangladesh, it looks nonsignificant due to organizational capacities to fit with the innovation in driving the adoption rather than policy supports. The finding emphasizes the need for an effective mechanism to create awareness, policy development and provide support that are understandable and acceptable to the organization.

Ethical Statement

The study was conducted in accordance with accepted ethical standards. Participation was voluntary, informed consent was obtained prior to data collection, and no personally identifiable information was collected or disclosed.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

The data that support the findings of this study are openly available in figshare at https://doi.org/10.6084/m9.figshare.32024814.

Author Contribution Statement

Mohammad Solaiman: Conceptualization, Methodology, Software, Validation, Formal analysis, Resources, Writing – original draft, Supervision, Project administration. **Md. Shahanur Islam:** Conceptualization, Validation, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review & editing. **Yeakub Ali:** Methodology, Software, Formal analysis, Investigation, Resources, Writing – original draft, Visualization. **Mohammad Faruk:** Resources, Writing – review & editing, Visualization. **Raiyan Chowdhury:** Investigation, Resources, Visualization.

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