

## RESEARCH ARTICLE OPEN ACCESS

# ChatGPT in Higher Education and Sustainable Development Goals: A Comparative Study of Institutional Perspectives from Developing and Developed Economies

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## ABSTRACT

The integration of Artificial Intelligence (AI) technologies—specifically Chat Generative Pre-Trained Transformer (ChatGPT) represents an innovative potential across diverse organizational and managerial levels, including higher education. ChatGPT contributes towards achieving Sustainable Development Goals (SDGs) in several ways by enabling scalable, personalized learning and lowering barriers to equitable access to quality education. However, regardless of its promising capabilities, existing research discourse reveals a notable gap in investigating how differing institutional factors not only influence ChatGPT's adoption, but also how these factors shape progress towards key SDGs. By drawing on Institutional Theory and the Technology-Organization-Environment framework, the qualitative data were collected through 24 semi-structured faculty interviews across developing and developed countries. The data was analyzed using reflexive thematic analysis following Braun and Clarke's six-step approach. The findings reveal divergent adoption patterns shaped by distinct institutional factors, and these differences carry notable implications for achieving SDGs, particularly related to quality education (SDG-4), reducing inequalities (SDG-10), and institutional strength (SDG-16).

## 1 | Introduction

The recent expansive proliferation of artificial intelligence (AI) has permeated and transformed nearly every business arena, promising unprecedented efficiency, automation, and innovation. The education sector is no exception; it provides support for content generation, interactive learning, and real-time student feedback crucial for achieving SDGs (Su et al. 2023). Among these ground-breaking technologies, ChatGPT—developed by OpenAI in 2022—stands out for its versatility and natural language capabilities (Su et al. 2023). It sparked extensive scholarly attention, given its potential to influence teaching, learning, and

assessment activities in higher education (Wang and Lin 2023; Zhai et al. 2021; Dwivedi et al. 2023). To date, a growing body of literature has focused on evaluating hopes and concerns associated with the tool in higher education (Budhathoki et al. 2024; Chan 2023; Celik et al. 2022; Chu et al. 2022; Phakiti et al. 2021). However, understanding its adoption patterns is far more essential than merely examining its benefits and drawbacks if the purpose is to ensure its widespread implementation in higher education (Zhu et al. 2006). Concerning the worldwide adoption of AI technologies, the role of differing economic, cultural, and regulatory contexts is becoming increasingly pronounced. Yet, little is known about ChatGPT adoption across diverse

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institutional and geographical contexts with varying economic and regulatory landscapes to fully capitalize on its educational benefits (P. K. Agrawal 2024). Recent scholarly work calls for conducting comparative studies focusing on the role of varying institutional factors and readiness in shaping the attitude towards the adoption of ChatGPT (Jafari and Keykha 2024; Al-Mughairi and Bhaskar 2024; Budhathoki et al. 2024).

At the same time, these institutional dynamics matter not only for ChatGPT adoption in higher education, but also for achieving SDGs. This is due to the critical positionality of the higher education sector in advancing several SDGs by being at the intersection of industry, society, and government as outlined by the United Nations. Previous scholarship explicates traction on the role of AI in advancing sustainability in industrial and corporate sectors, leaving higher education underexplored—particularly with respect to specific SDGs (Jeste et al. 2020; Leal Filho et al. 2023). In contrast, some scholars acknowledge the broader relevance of SDGs to higher education, yet the influence of varied institutional contexts—enablers and barriers that influence the implementation of specific SDGs—quality education (SDG-4), reduced inequalities (SDG-10), and strong institutions (SDG-16) remain overlooked (Abad-Segura et al. 2020; Elango 2024). Accordingly, this interdisciplinary, comparative study is put forward to understand contextually grounded adoption of ChatGPT within the higher education sector to help address uneven progress on achieving SDGs (United Nations 2015). This research furthers by drawing on Institutional Theory and the Technology-Organization-Environment (TOE) framework to explore how diverse institutional contexts influence the adoption of ChatGPT in higher education. Focusing on faculty perspectives, this research examines how these distinct institutional factors influence the achievement of selected SDGs across developing vs. developed economies. The study is guided by the following main research question with two subquestions:

**RQ1.** How do different institutional context factors within developing and developed countries influence the adoption of ChatGPT?

- a. How do the institutional factors in the adoption of ChatGPT influence SDG-4, SDG-10, SDG-16?
- b. What comparative insights can be drawn from these differing factors in developing versus developed countries?

Using qualitative, comparative design we conducted semi-structured interviews with faculty members of public and private universities from developing (China, Oman, Pakistan, Saudi Arabia, and Thailand; China is categorized as “developing” under WTO, Kanwit 2023) and developed (Finland, Hong Kong, Ireland, Portugal, and the United Arab Emirates (UAE)) countries. Data were analyzed using Braun and Clarke (2006) six-phased method for reflexive thematic analysis. Preliminary findings of the research suggest that adoption of ChatGPT is influenced by regulatory support, readiness of digital infrastructure, faculty expertise/support, competition intensity, and environmental uncertainty. It also suggests that the perceived alignment between adoption of ChatGPT and SDGs varies suggestively across developing and developed countries. The findings offer valuable implications for administrators,

policymakers, and educators on devising institutional strategies to create a favorable environment for adoption that strengthens their organizational outcomes while achieving SDGs.

## 2 | Literature Review

### 2.1 | ChatGPT in the Higher Education Sector

Over the past century, the education sector has witnessed a massive transformational shift in its teaching and learning practices due to the influx of innovative technologies. These technologies are either core AI technologies or those linked to the former to amplify their functionalities, such as robotics, metaverse, blockchain, augmented reality, virtual reality, mobile technologies, and simulation learning (Al-Rahmi et al. 2022). Nevertheless, the recent colossal rise of AI demonstrates a multifaceted impact, specifically on higher education (Dwivedi et al. 2023). Among AI technologies, ChatGPT saw a considerable surge in demand within the first week of its introduction to the public and in higher education (Eke 2023; Firat 2023). Within the academic context, the role of ChatGPT is to create personalized content and support adaptive learning to enhance students' educational experiences (Holmes and Tuomi 2022). This practical functionality of ChatGPT to produce contextually appropriate content has drawn attention and heightened concerns (Eke 2023). Several studies on AI and ChatGPT in education have informed us about the challenges and benefits (Luo et al. 2024). While stating the benefits of ChatGPT within the teaching and learning sphere, studies suggest that ChatGPT serves as a mentor for higher education students by defining their educational objectives, finding resources, and tracking progress (Lin et al. 2023; Celik et al. 2022; Chu et al. 2022). Contrary to this, Shoufan (2023) argued that it cannot replace human mentors because of its inherent tendency to generate false information.

Moreover, several studies highlighted the reputational and pedagogical risks associated with plagiarism and inequitable assessment when ChatGPT is adopted in higher education (Phakiti et al. 2021; Chan 2023). Scholars also warn that potential over-reliance on the tool could inhibit student critical thinking skills, prompting some to impose bans (Essien et al. 2024; Chan and Lee 2023; Hidayat-Ur-Rehman and Ibrahim 2024; Kohnke et al. 2023). Concerns also involve diminishing roles of teachers, unclear set of guidelines, and lack of institutional support which further complicates adoption (Crawford et al. 2024; Al-Mughairi and Bhaskar 2024; Chiu et al. 2024).

### 2.2 | Sustainable Development Goals, AI, and Higher Education Sector

Since 2015, the notion of “sustainable development” attained widespread prominence following the UN's 2030, which comprises 17 Sustainable Development Goals (SDGs) to steer the world towards achieving a more sustainable, peaceful and inclusive future (Gupta and Vegelin 2016, Lim et al. 2018). Realization of the SDGs hinges on alleviating poverty, gender disparities, social inequalities, while fostering climate awareness and managing resources sustainably. Despite notable strides made over the past 5 years, progress remains inconsistent across countries

and domains—underscoring the need for engagement from all stakeholders. Among these stakeholders, higher education institutions are pivotal in advancing SDGs because they integrate sustainability into research, operations, and community engagement (Chankseliani and McCowan 2021; Leal Filho et al. 2023). Given their vital role, higher education institutions are regarded as the agent of change that can resolve contemporary yet intricate social, environmental, and economic challenges globally (Hesselbarth and Schaltegger 2014). In this regard, Hwang and Chang (2023) elucidated that UAE's initiative of AI's adoption in education and other sectors demonstrates its sustainability potential with research refining the application of AI. Moreover, recent research focusing on the intersection of AI technology, higher education, and sustainable development (Yousif et al. 2025) showed significant improvement in academic performance and student engagement. Moreover, the authors also linked how these technologies are contributing to SDG-3 (Good health and well-being), SDG-4 (Quality Education), SDG-8 (Decent work, Economic prosperity), and SDG-9 (Industry, Innovation and Infrastructure) (Yousif et al. 2025). Their research delineates the potential of AI not just as a pedagogical support but as a mechanism to foster sustainability.

The research highlights several limitations related to institutional readiness and resource constraints, suggesting further exploration that includes sample diversity and cross institutional comparison. Kulkov et al. (2023) suggested investment and innovation in the education sector to advance SDG-3, SDG-4, and SDG-5 and examined how AI can promote learning and gender equity. Likewise, Wang and Zhang (2024) also explored how AI helps advance SDG-8 (Decent work and economic growth) and SDG-12 (responsible consumption and production). The authors underscore the importance of incorporating organizational contexts, leadership, and resource availability in future studies, providing rationale for our research.

### 2.3 | Factors Influencing Technology Integration in Higher Education and SDGs

In accordance with earlier findings, the higher education sector, regarding technology integration, has its own institutional and administrative contexts that affect adoption decisions (Sailer et al. 2021). An educational institution involved in digital entrepreneurial activity through introducing any technology (i.e., digital/AI) is influenced by three sub-contracts that is, the regulatory, normative, and cognitive environment in any country. Inadequate planning, unsupportive leadership, and weak infrastructure are the leading institutional barriers to digital technologies adoption (Magen-Nagar and Maskit 2016). Effective integration requires institutional support and cultural alignment (Romero et al. 2019).

### 2.4 | Relevant Theories, Institutional Context, and Adoption of ChatGPT

The overall operating environment and framework within which an institution functions are labelled as institutional context. It entails policies, procedures, norms, organizational structure, and resources that guide institutions to make decisions and

operate accordingly (Magen-Nagar and Maskit 2016). In higher education, the institutional context can impact the integration of AI technologies such as ChatGPT. The existing literature shows that technology adoption has been studied using both Institutional Theory and TOE frameworks independently in the past. However, their combined application to study the adoption of ChatGPT with higher education provides a multidimensional view. For this research, the TOE framework identifies how technological readiness, institutional support, and environmental factors shape adoption decisions, whereas Institutional Theory develops an understanding of the sociological lens that explains why and how institutions respond differently because of coercive, normative, and mimetic pressures. The combined application of these frameworks enables a more comprehensive understanding of adoption behaviors and elaborates on why institutions either resist or conform to diverging contextual logics. The linkage of two perspectives allows not only to analyze the structural constraints but also to develop a better understanding of the socio-cultural factors that influence ChatGPT adoption in higher education and advancing chosen SDGs. The subsequent paras discuss the relevance and appropriateness of both Institutional Theory and the TOE framework to this research.

The central doctrine of the institutional theory depicts individuals as the compliers of social pressure while external forces support organizations in building resources. Institutional environment comprises three components that is, normative, coercive, and regulatory, which are then motivated by three mechanisms (Ciftci et al. 2019). These include normative pressure; it illustrates the pressure exerted by governmental agencies and those who already utilized the technology to maintain a culture of cooperation (Dubey et al. 2019). In the case of ChatGPT and other generative AI tools, the adoption process is contingent upon the influence exerted by the regulatory bodies and is considered normative pressure (P. K. Agrawal 2024). On the other hand, coercive pressure influences dominant firms that are dependent on the central firm.

Mimetic pressure emerges when organizations have limited understanding and technological resources, environmental uncertainty, and ambiguous objectives, and they mimic what successful organizations are doing (Srinivasan and Swink 2018). While there is a lack of standards and a market for generative AI, organizations only opt for the lead of successful adopters. Regarding the adequacy of the TOE framework for adopting innovative technologies, the researcher tries to explicate it through extant literature to support our decision of the appropriateness of the research. According to the TOE framework, the factors influencing adoption fall into technological, organizational, and environmental domains (P. K. Agrawal 2024). Reportedly, the TOE framework has been used in the discontinuation of information systems research (Furneaux and Wade 2011), electronic data interchange study (Kuan and Chau 2001), and in the study of big data adoption (K. Agrawal 2015). According to scholars, technological readiness is about having skilled people, IT skills, managerial capabilities, and robust IT infrastructure which ensures smooth integration of ChatGPT (P. K. Agrawal 2024). While organizational context is about financial health, technological infrastructure, quality human resources, and prior experience with technology that shape behaviors toward adoption (P. K. Agrawal 2024).

The environmental context encapsulates competitors, broader industry dynamics, and collaboration with governmental bodies. In competitive markets, the desire to stay ahead of rivals is the primary driving force to embrace new technologies (Bolloju and Turban 2007). By contrast, lack of governmental support to set standards for generative AI creates hindrance in the adoption process (P. K. Agrawal 2024). Accordingly, the existing literature confirms the TOE framework as a suitable lens for identifying the influencing factors that shape the adoption decisions. Subsequently, this research employs the TOE framework to comprehend the elements that influence the acceptance of this new disruption in educational settings. Building on the above, the iterative aspect of ChatGPT, effective adoption relies on institutional contexts and the external environment. Though institutional dynamics between developing and developed contexts differ massively—yet this contrast is neglected in the research linking generative AI and the SDGs (Chaudhry et al. 2018; Tripathi and Brahma 2018; Ge et al. 2020). Our research is a timely attempt to address this gap by conducting a comparative study across developing and developed countries with respect to their differing institutional perspectives and their impact on the SDGs.

### 3 | Research Methodology

The nature of the study is exploratory, so the researcher employs a qualitative design grounded in the interpretivist paradigm which acknowledges that reality is socially constructed and contextually dependent. The aim of the research is to explore how institutional and contextual factors influence the adoption of ChatGPT within higher education across developed and developing countries by taking individual faculty members as a unit of analysis. The comparative element draws from cross-contextual disparities, rather than embedded case structures. Moreover, it also explores how distinct factors impact chosen SDG-4 (quality education), SDG-10 (reduced inequalities), and SDG-16 (peace, justice, and institutional trust and governance). Using purposive sampling techniques, we conducted semi-structured interviews from 24 faculty members from a range of public and private universities in developed and developing countries. This sampling strategy was instrumental as it provided us the opportunity of selectively involving exemplars that best represented the phenomenon under study (Etikan et al. 2016). Moreover, this sampling method is appropriate when the research requires a deep dive into specific traits or attributes of participants aligned with the research questions (Palinkas et al. 2015). The researchers sourced participants through their professional networks and online professional portals such as LinkedIn. The demographics of respondents are given in Table 1. This methodology also ensures that the study focuses on participants with the required exposure to technological adoption instances while also approaching potential participants efficiently and feasibly.

The data was gathered from five developing countries that is, Pakistan, Oman, Saudi Arabia, China, and Thailand and five developed countries that is, Finland, Hongkong, Ireland, Portugal, and UAE. Regarding selection of sample size, the researcher followed the most prevalent recommendation of size range from 12 to 20, from minimum to maximum for longer projects respondents (Baker and Edwards 2012). On the other hand, Bertaux (1981) suggested that sample size of 15 respondents is

**TABLE 1** | Demographics of respondents (data compiled by author).

Variable	Category	Frequency	Percentage
Gender	Male	15	62.5
	Female	9	37.5
Age group	Under 25	2	8.3
	25–34	5	12.5
	35–44	16	66.7
	45–54	0	0.0
	55 or older	3	12.5
University type	Public	18	75.0
	Private	6	25.0
	Total	24	100.0%

sufficient in a qualitative study. However, selecting 12 respondents for each group (i.e., developed and developing countries) is appropriate as the goal is to study adoption behaviours across diverse contexts (Bertaux 1981). The data from faculty members was gathered by conducting in-depth, semi-structured interviews via face-to-face interaction and utilizing Zoom/MS Teams to record their answers. On average, each participant was interviewed for 30–45 min. The interview session comprised 11 open-ended questions developed by the researcher to uncover the opinions of faculty members regarding the adoption of ChatGPT within their universities and their progress toward SDGs. The researchers took notes and recordings during the interview process. For data analysis, the six-phased framework of Braun and Clarke (2006) as shown in Table 2, used for conducting reflexive thematic analysis.

This method is used due to its widespread acceptance, flexibility to identify, analyse and report patterns within the data. This approach enabled us to integrate both deductive guidance from intuitional theory and TOE framework with inductive coding that surfaced patterns from the data beyond earlier theoretical assumptions.

To safeguard analytical rigor, the study focused on ensuring transparency in coding procedures, consistency between theoretical underpinnings and analytical strategy, and reflexivity, where the researcher ensured their active engagement and positionality in the interpretive process. Moreover, the inclusion of diverse participants' narratives and cross-contextual comparisons between developed and developing countries supports analytical transferability, which strengthens the overall research credibility and robustness of research outcomes. Traditionally, the reliability and validity of the data are associated with quantitative studies, but Hansen and Husmoen (2016) advocated its application for qualitative studies. To validate the data, the researcher used the strategy of member-checking (Birt et al. 2016). Therefore, five respondents were randomly chosen after data analysis and reported their research findings, approved and reviewed them. To ensure compliance with research ethics, the researchers informed the participants that their conversations would be recorded during the interview sessions. They were further assured of the confidentiality of any other information they declared.

**TABLE 2** | Steps of data analysis (Author's creation).

Steps involved	Description of data analysis
1. Develop data familiarity	The researcher transcribed the textual and audio-recorded data by thoroughly listening, reading, and re-reading multiple times to identify patterns and look for emerging themes and meanings shared by the participants.
2. Forming initial codes	The researcher analyzed interview texts (paragraphs) and labelled meaningful text, such as phrases and sentences, by considering each unit equally, indicating the participants' opinions.
3. Developing primary themes	The primary codes were then documented, examined, and categorized according to the research question, and those codes were organized to develop preliminary themes.
4. Reviewing themes	Similar codes were merged, the sufficiency of code numbers was confirmed, the consistent patterns within the coded dataset were identified, and the entire dataset was reviewed cohesively.
5. Defining and naming themes	The final themes were organized based on commonalities, given names, and defining narratives for each theme, integrating the entire data narrative to address research questions.
6. Report writing	Drafting the final report by presenting results of thematic analysis as a summary of key findings and quotes of participants comprised of all themes.

## 4 | Research Findings

### 4.1 | Theme 1: Attitude Towards the Adoption of ChatGPT

A comparative analysis of the initial responses toward the adoption of ChatGPT in higher education highlights contrasting attitudes between developing and developed countries, shaped by their differing institutional and contextual dynamics.

- Supportive versus skeptical approach

The comments of the academic staff in developing and developed economies reflect a diverse landscape of attitudes, concerns, and institutional responses. Interviewee No. 2 responded:

Well, honestly, it was just like walking into uncharted territory. The stakes were high as it could inhibit students' creative thinking capability and potential cheating source. We were unsure of its impact, so we banned it. It could affect quality education (SDG-4).

About 90% of respondents from developing nations—including China, Oman, Saudi Arabia, and Pakistan—adopted a cautious stance in the beginning and decided to wait for potential outcomes before integrating the tool. They also reported concerns about university's reputation that could be affected due to over-reliance on the tool, indicating gaps in institutional readiness (SDG-4), and widening digital divide between countries, institutions, and communities (SDG-10). Interestingly, only Omani respondents among the developing nations reported that ChatGPT aligned with their institutional goals. Interviewee No. 7 stated:

My university adopted the tool quickly as it aligned with its mission to foster innovation and provide quality education (SDG-4). For us, ChatGPT offered an opportunity to cater to diverse learners' needs and reduce resource disparities (SDG-10).

Conversely, about 70% of respondents from developed countries—including Hong Kong and the UAE—expressed enthusiasm for embracing ChatGPT for its innovative potential in teaching and learning. They were intrigued by its customization potential and personalization capabilities to design course material and assessments. A few participants from Ireland and Portugal recorded that their faculty adopted a cautious stance, were more worried about its impact on the curriculum, and saw it as a threat to traditional teaching methodologies. Interviewee No. 4 states:

I believe ChatGPT has this wonderful potential of enhancing one's teaching and learning experiences which strongly support SDG-4. Faculty at our university have been fully onboard since the very inception of this AI tool, which has helped us design assessments and prepare course material (SDG-16).

Interviewee No. 11 reported:

Well, ChatGPT help student learning, but they would stop thinking independently. It could disrupt our teaching methods. Therefore, we remained cautious initially because this way, SDG-4 cannot be achieved. However, we are working to ensure fair advantage of ChatGPT for all students (SDG-10).

This reflects that developed nations are better positioned to integrate ChatGPT sustainably by showing commitment to inclusive, equitable, and adaptive learning (SDG-4) while reducing disparities and fostering institutional integrity.

### 4.2 | Theme 2: Institutional Support

- Existence versus absence of guidelines

When asked about the presence of guidelines or policies regarding the use of ChatGPT in teaching practices, most respondents (80%) from developing countries that is, Saudi, China, Thailand, Pakistan, and Oman, spoke about their disillusionment with the regulatory environment within their countries. According to Interviewee No. 5:

We did not receive guidelines from our university or the higher education regulating body. Whether we integrate ChatGPT into our teaching practices or not is up to us and a bit concerning, to be honest. This points to weak governance (SDG-16).

A low number of respondents (20%) from the developing context reported either limited guidelines provided by their universities on the ethical use of ChatGPT or they were unaware of the existing guidelines. According to Interviewee No. 9

Yeah, apart from the policy on plagiarism, paid plagiarism-checking tools are also available to faculty members. We as teachers discuss with our students in an individual capacity—no proper institutional regulations (SDG-16).

Interviewee No. 14 remarked:

Though, there exists a higher education commission policy for plagiarism. But I have not read any policy regarding the use of ChatGPT.

Under this scenario, developing countries failed to achieve SDG-16 due to regulatory uncertainty, ethical concerns, and weak governance that restrict them from adoption. On contrary to this, developed countries such as Hong Kong and Finland, 70% of faculty members indicated that their universities had established comprehensive policies and guidelines on ChatGPT, addressing the concerns of academic integrity, bias, and fairness. These policies provide immense clarity on the appropriate technology usage in educational settings which also enable them to contribute to the SDG-16 as they have regulated and trusted frameworks for the adoption of novel technologies. A few respondents (20%) from Portugal and the UAE expressed a lack of clear or specific directives. They see ChatGPT as unproblematic and does not require scrutiny in an academic context. A smaller proportion of respondents (10%) from Ireland and Finland revealed their uncertainty or unclear directives regarding the use of the tool.

Interviewee No. 21 and 13 respectively stated that:

Yes, we are given guidelines on its ethical use, but there isn't any consensus on the authenticity of AI-generated content, assessment validity, and promoting equity among students (SDG-10) on its use as we never know which student totally copy-pasted the content/ideas and which just used to develop initial understanding of the task.

Our university provided guidelines which show their commitment to accountability in its use. I think this strong institutional support and ensuring the responsible use contribute to SDG-4 and SDG-16.

Only a small proportion of interviewees from both developed and developing countries reported unawareness of ChatGPT impact on higher education. This is primarily due to a lack of information dissemination regarding institutional stances on this technology. This disparity, that is, clear guidelines in developed countries versus absence of the ones in developing regions, underscores an institutional governance gap (SDG-16). This highlights the tremendous challenges that developing nations face in the ethical adoption of ChatGPT. In summation, where guidelines are clear, SDG-16 thrives and where uncertainty or lack of awareness exists, both SDG-4 and SDG-10 suffer on both sides, albeit at varying percentages.

### 4.3 | Theme 3: Technological Proficiency

- IT readiness versus IT unpreparedness

Among developing countries, only Saudi and Omani faculty members (15%) reportedly have higher technological proficiency, strong IT department capabilities, robust financial resources, and faculty training, and proactive leadership willing to integrate ChatGPT (SDG-4 and SDG-16). A similar percentage of respondents from Thailand and China called for improvement in almost all areas, including IT infrastructure and levels of commitment to integrate technology at all levels signaling lack of contribution to SDG-4. Pakistani respondents were notified of the poor IT capabilities and lack of previous experience with technology, which has left the faculty members in deadlock to deal with this latest disruption. Interviewee No. 13 said:

Our university does not have the required technological infrastructure and resources. I think there will be challenges as we won't be able to contribute toward ensuring quality education (SDG-4).

Moreover, in the developing world, most respondents (60%) from Pakistan, Saudi Arabia, and China specified the tool's non-alignment with their institutional goals. This has significant negative implications for the realization of SDG-4 (Quality Education) due to infrastructural and policy-related concerns. This led to challenges in equitable implementation of the tool, which ultimately resulted in widening discrepancies in higher education (SDG-10) and undermining trust within the institutions (SDG-16). The remaining respondents from Oman and Thailand stated that their IT departments as supportive.

I believe ChatGPT is going to disrupt traditional teaching methodologies, which would cause a sense of confusion. Universities need to be proactive (SDG-16) and address those concerns by providing teacher training (SDG-4).

The majority of the participants (60%) from developed countries such as Hong Kong and Finland stated a high level of readiness in terms of IT proficiency, strong IT capabilities, technical feasibility, security implications, and deep commitment of the organizational leadership towards the adoption of ChatGPT and contribute to the targets of SDG-4 and SDG-16 by exhibiting readiness in terms of clear IT policies and institutional governance. A moderate number of respondents (40%) reported that their university has a moderate level of IT proficiency, and they need to improve their commitment along with enhancing the capabilities of their staff. Others from Ireland and Portugal talked about the challenges their universities face in terms of low levels of IT proficiency and the commitment of their leadership to successfully navigate the impact of this latest disruption. Overall, the developed world demonstrated a higher level of IT readiness and commitment, whereas the developing world depicts growing awareness, but continues to experience financial and infrastructural challenges that hinder progress (SDG-10 and SDG-16).

#### 4.4 | Theme 4: Competition Intensity

- Pressure to adopt versus reluctance to embrace

Participants from developing countries reported that they experienced pressure from competitors regarding the adoption of ChatGPT. 60% of interviewees, solely from Pakistan and China, reported that initially, they were skeptical of the technology's disruptive effects; they banned it, following the footsteps of other universities. This shows their weak governance and institutional policy (SDG-16).

Interviewee No. 16 indicated:

At the start, we looked at the adoption of ChatGPT by other universities and fellow colleagues. The focus was more on its disruptive effects, so we banned it. Our institutional decision was driven by imitation of other universities (SDG-16).

Contrary to the above, 40% of the respondents from Thailand, Oman, and Saudi Arabia showed a palpable sense of aspiration to follow in the footsteps of their counterparts in the developed world. These uneven pressures negatively contribute to SDG-10, which aims at mitigating inequalities within the developing countries where elite institutions go for adoption leaving behind others.

However, the trend remained dissimilar in developed countries, as they experienced distinct but equally compelling competitive pressure to adopt ChatGPT and contribute to SDG-4 by improving digital learning and fostering quality education. It also reflects their strong institutional environment that compels them to adopt ChatGPT and contribute to SDG-16. They stated that they, as a member of the developed world, consider themselves trendsetters in integrating modern technologies. Around 70% of the faculty members were from Hong Kong, UAE, and Finland, despite the environmental uncertainty and the competitive pressure to stay competitive and enhance their educational offerings.

Interviewee No. 20 remarked:

As a faculty member, I believe adopting cutting-edge technology not only allows us to improve our educational offerings but also increases our credibility among the competitors which contributes toward SDG-4 and SDG-16.

The results of the interviews suggest that contextual influences, technological readiness, institutional and cultural dynamics, along with the memetic pressure experienced by the faculty members and their respective institutions affect decisions regarding the adoption of ChatGPT which influences progress toward achieving the stated SDGs.

## 5 | Discussion

The present study examined the factors that influence organizations' internal aspects along with the external environment by drawing on institutional theory and the TOE framework across developing and developed economies that impacted the adoption of ChatGPT within higher education. It also explains how they either contribute to or hinder universities across developing and developed countries in achieving SDG-4, SDG-10, and SDG-16. Our respondents from developing countries were more skeptical of this disruption and followed in the footsteps of their fellow universities to ban it due to ethical, over-reliance, inequitable assessment, biased content, no critical thinking, and hallucination concerns as outlined in the previous literature (Al-Mughairi and Bhaskar 2024; Chan 2023; Shoufan 2023; Chan and Lee 2023; Hidayat-Ur-Rehman and Ibrahim 2024; Phakiti et al. 2021). This was due to their IT unpreparedness and reflection on institutional weakness (SDG-16). Intriguingly, faculty in developing countries indicated that plagiarism concerns were not the hindrance while adopting ChatGPT, which negates the findings of Hidayat-Ur-Rehman and Ibrahim (2024) and Chan (2023). Moreover, the absence of guidelines demonstrates that developing countries lack strong institutional capacity and a regulatory framework that not only obstruct technology integration but also keep them from achieving SDG-4 and SDG-10.

As previously indicated, developed countries were particularly interested in ChatGPT's benefits of personalization and customization which led them to embrace it with enthusiasm, coinciding with the findings of (Elbanna and Armstrong 2024; Lund and Wang 2023; Baidoo-Anu and Owusu Ansah 2023; Eke 2023). Moreover, their clear policies and IT readiness led them to contribute SDG-16, which also enabled them to address SDG-4 and SDG-10 effectively.

From the lens of institutional theory, initially, the higher education faculty within the developing countries acted in response to normative pressures, which agrees with the findings of Bag et al. (2021) that coercive and normative pressures depict a positive association with the skill development of a faculty. It kept the universities conforming to the prevailing traditional methodologies despite a lack of regulatory support from their institutions or higher education bodies (SDG-16).

Developing countries expressed heightened disillusionment with the regulatory environment within their countries due to the lack of explicit guidelines and policies for the ethical use of ChatGPT in educational settings (Lin et al. 2023). This underscores the requisite for open and transparent policy and regulation for the ethical use of ChatGPT (Al-Mughairi and Bhaskar 2024). Moreover, the lack of institutional support, along with the absence of technological resources and restrictions on using ChatGPT, poses challenges for the faculty to adopt innovative technologies, which are proven by the research of Lin et al. (2023), and they also indicate weak institutions and low-quality education (SDG-4 and SDG-16). The presence of such support and clear guidelines stating the use of ChatGPT within developed countries encourage teachers to integrate ChatGPT into their teaching practices (Chiu et al. 2024; Al-Mughairi and Bhaskar 2024).

In terms of technological context, it is evident from the research findings that developing countries have relatively immature technology, insufficient technical feasibility, lack of IT capabilities, and absence of leadership commitment, which leads them to maintain their focus on existing systems instead of experimenting with new technologies which align with the findings of Chau and Tam (1997). Universities within developing countries are more prone to associated challenges and risks rather than gaining a competitive advantage over other countries (P. K. Agrawal 2024). On the contrary, developed countries have previous experience with technologies, and robust IT capabilities, financial resources and leadership support allow them to consider potential benefits rather than prioritizing challenges when making the adoption decision, which contrasts with the finding of P. K. Agrawal (2024). While looking at the organizational context, the findings of the study suggest that in some instances within the developing countries where IT proficiency and other resources are not a problem, universities have opted for a “wait and see” approach to evaluating the impact of ChatGPT before committing to it (P. K. Agrawal 2024). In contrast, the case with the developed world remained different. Moreover, aligned with widespread belief, the presence of regulatory/institutional support fosters the adoption of ChatGPT within developed countries. However, the case is otherwise for developing countries due to the absence of proper regulatory support mechanisms. Interestingly, environmental uncertainty inhibits developing countries from delving into new technologies to protect their reputation and financial and technical resources. This corresponds to the study of Pramanik et al. (2024) which states that while the technological and infrastructural factors are consistent, the societal and educational factors vary between the developed and developing countries. They respond to mimetic pressure as they do not take risks to integrate this new technology but to the other successful adopters in the industry due to unpredictable environments and objectives (Srinivasan and Swink 2018).

In contrast, higher education sectors within developed countries expressed their enthusiasm for engaging in innovation and strategizing towards maintaining their competitiveness (Bolloju and Turban 2007). The findings of the study present that competitive pressure is higher within developed countries compared to non-adopters in developing countries, which is in line with the results of P. K. Agrawal (2024). Finally, the findings of the research underscore an intricate relationship between ChatGPT,

higher education, institutional context, and SDGs. The research outcome suggests that the adoption of ChatGPT poses several risks and opportunities and requires certain institutional factors for achieving SDGs across developing and developed countries. Therefore, we contend that understanding varying institutional contexts while integrating ChatGPT is fundamental for achieving SDGs targets, especially SDG-4, 10, and 16. If concerns of plagiarism and data accuracy are addressed through proper guidelines in place then it will increase personalized learning, accessibility, and engagement—which aligns with SDG-4 target. Moreover, the faculty has heightened concern regarding overreliance and diminishing of critical thinking; data inaccuracies and ethical considerations are all negatively affecting SDG-4 targets. It is truly important for countries to develop ethical guidelines to mitigate biases and positively contribute towards achieving SDGs goals. This study calls for prioritizing regulatory frameworks that could effectively contribute to SDGs. Faculty also notified concerns of their diminishing role and affects target SDG-4 (proper recruitment, training, and working conditions for teachers). The capability of ChatGPT to manage workload and increase productivity also impacts SDG-4 positively.

**Research Proposition 1:** *Cautious or embracing attitudes towards adopting ChatGPT within the higher education sector of developing and developed countries are due to normative pressures emphasizing concerns of academic integrity and reputation coupled with a lack of regulatory/institutional support, influence SDGs accordingly.*

**Research Proposition 2:** *The absence or presence of proper guidelines and regulatory support in developing and developed countries may increase or decrease the likelihood of ChatGPT's adoption within the higher education sector and contribute to SDGs.*

**Research Proposition 3:** *Technological readiness, organizational support, leadership commitment, resource proficiency, and infrastructure correlate to higher or lower rates of ChatGPT adoption in developing and developed countries and their contributions to SDGs.*

**Research Proposition 4:** *Higher environmental uncertainty and competitive pressures from peer institutions lead to higher or lower adoption rates of ChatGPT in the higher education sector in both developing and developed countries and contribute to SDGs differently.*

## 6 | Conclusion

A cross comparison reveals the criticality of institutional contexts and concludes that despite the numerous opportunities offered by ChatGPT to higher education institutions, substantial levels of adoption have not been seen across different geographical regions. This is due to their distinct institutional environment that is, technological resources, competition intensity, environmental uncertainty, and regulatory environment. Overall, both developing and developed countries have their own set of challenges, but having better infrastructure and faculty expertise, a supportive regulatory environment, environmental uncertainty, and higher competition intensity

enabled developed countries to have an edge to pursue a smoother integration contrary to their developing counterparts that seriously lack the resources described above. In developing economies, the absence of explicit guidelines, technological immaturity, lack of regulatory support, weak institutional governance, and environmental uncertainty are the barriers hindering its adoption. These barriers lead them to cautious adoption which restricts them from fostering learning and innovation in higher education and undermines the goal of achieving quality education (SDG-4). Furthermore, lack of technological readiness and absence of leadership support exacerbate the digital divide and undermine the goal of reducing inequalities (SDG-10) where elite institutions thrive leaving others behind them. Lack of coherent policy and ethical frameworks also reflects weak institutions, impeding their progress towards achieving a strong institution (SDG-16). Conversely, developed nations demonstrated a proactive stance towards adoption combined with leadership commitment, technological preparedness, and a proper governance framework. These institutional factors allow them to contribute directly to SDG-4, SDG-10, and SDG-16 by enhancing quality education, equitable access, and responsible use of ChatGPT. Thus, the findings reaffirm that institutional factors are crucial differentiators for sustainable, equitable, and ethical adoption of ChatGPT in higher education.

### 6.1 | Theoretical Contributions

In summation, as far as we can ascertain, this research is the first to cover a large-scale qualitative investigation based on the actual views of faculty members from both developing and developed worlds regarding the institutional and contextual roles in adopting ChatGPT in the higher education sector, and SDGs. This research provides a nuanced understanding of the contextual differences considering the institutional theory TOE framework surrounding the adoption of ChatGPT. Moreover, regulatory support and environmental uncertainty have been given little attention in previous technology adoption and sustainability studies within the educational context. This study fills the gap in literature by identifying the factors that influence the adoption of ChatGPT and how they hinder or facilitate SDGs.

### 6.2 | Implications for Practice

Based on their distinct institutional contexts, the study allows decision-makers and universities to assess their staff's IT capability, knowledge and skills, identify obstacles hindering the adoption of ChatGPT within higher education and devise strategies to mitigate those barriers and work towards improving their efforts for sustainable development. It informs developing countries that higher competitive pressure and attainment of SDGs work as a catalyst for adopting ChatGPT within the context of developed countries. They must consistently work to develop competitive differentiation. It also guides policymakers and regulatory bodies in developing and developed countries to develop explicit institutional policies and guidelines to ensure ethical and legal compliance with ChatGPT.

### 6.3 | Limitations and Future Research Directions

Despite making some promising contributions, the present research lacks limitations that pave the way for future research. First, the sampling population, sample size, and sampling techniques limit the generalizability of the findings to all regions or countries. The sampling population solely comprises faculty members. From a holistic point of view, future research should involve other stakeholders, such as administrators, students, IT personnel, and higher education regulatory bodies, which would add value. Future research should consider the inclusion of more participants from different countries or more regions that is, European, Gulf, or Asian states, and conduct cross-section comparison to better understand the influences of contextual differences while integrating ChatGPT. Third, the qualitative research approach might not offer a full range of perspectives. Future research should employ a mixed methods approach to get more accurate and reliable results. Fourth, while this research utilized theory-informed thematic analysis, future studies could employ Gioia methodology to inductively build new theories around the journey of ChatGPT adoption by making sense of the resistance and acceptance as institutional and ethical frameworks continue to progress. Fifth, the study only employed institutional theory and TOE framework; future research could use other established theories such as diffusion of innovation, unified theory of acceptance and use of technology (UTAUT), and Technology adoption model (TAM) to develop a model. Lastly, this research only considered SDG-4, SDG-10, and SDG-16. Future studies could assess remaining SDGs for using ChatGPT in higher education across different contexts.

#### Author Contributions

**Sumaira Nazeer:** data curation, methodology, formal analysis, writing – original draft, writing – review and editing. **Muhammad Saleem Sumbal:** supervision, methodology, data curation, project administration, writing – review and editing. **Naveed Yasin:** methodology, formal analysis, writing – review and editing. **Jawad Abbas:** methodology, writing – review and editing. **Armando Papa:** writing – review and editing. Liu Gang: Writing – review and editing.

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#### Conflicts of Interest

The authors declare no conflicts of interest.

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