



# Academics as adopters of generative AI: an application of diffusion of innovations theory

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## Abstract

The background for this research is an ongoing discussion towards generative AI in the higher education context. This study aimed to understand the factors influencing the adoption of generative artificial intelligence by academicians, utilizing the Diffusion of Innovations (DOI) theory. Drawing on Rogers' Diffusion of Innovations (DOI) theory, this study investigates the antecedents of ChatGPT adoption among 640 academics from ten major Polish universities. Seven hypotheses were tested using partial least squares structural equation modeling (PLS-SEM). The results reveal that relative advantage ( $\beta=0.240$ ), compatibility ( $\beta=0.214$ ), and perceived complexity ( $\beta=0.383$ ) significantly influence behavioural intention, which in turn strongly predicts actual use ( $\beta=0.558$ ). Trialability exerts a modest but significant effect on intention ( $\beta=0.071$ ), whereas observability is non-significant ( $\beta=-0.004$ ). Personal innovativeness further enhances actual use ( $\beta=0.209$ ). Collectively, the model explains 49.6% of variance in behavioural intention and 45.0% in actual usage. The results suggest that ChatGPT is perceived by academicians as a tool that facilitates and enhances academic and teaching work. The study fills a gap in the literature regarding the adoption of ChatGPT in academia from the DOI perspective. The findings highlight the importance of factors such as complexity and relative advantage in the adoption process of technological innovations in higher education. Further research is recommended on the implementation of AI tools in teaching and their impact on the efficiency of academic work.

**Keywords** ChatGPT · Diffusion of innovations · Technology adoption · Academia · Behavioral intention · Personal innovativeness

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## 1 Introduction

Large language models have taken the world by storm. Machine learning algorithms are taking space in every walk of life changing the entire ecosystem of production and consumption (Zhao et al., 2024). Since its inception, numerous large language models have been developed including GPT (Wang et al., 2023). Change from industry 4.0 to industry 5.0 is visible where humans and AI are walking in the new world together creating a shift in the ecosystem from technology driven to value driven activities (Longo et al., 2020; Mai et al., 2024; Xu et al., 2021).

Chatbots have created a new segment of databases equipped with human-like tasks and have already opened various opportunities for both industry and academia to grow in symbiotic manner (Sharma et al., 2024). Large language models are increasingly finding key space in academic field (Nissim & Simon, 2025; Ramandanis & Xinogalos, 2023; Tahiru, 2021). Through numerous applications and models that are available, it can be used to enhance various academic pursuits. Academicians can benefit greatly as it creates new horizons in the teaching-learning arena (Alemdag, 2025).

Artificial Intelligence and natural language processing tools have transformed academic architecture through massive datasets that aid in content creation, improvement, and summarization (Akpan et al., 2024). It has become the nucleus of innovation and improvement that not only provides ease in evaluation and grading, but also enhances scope of student's competency mapping and creates an improved framework for a better feedback system (Kasneci et al., 2023; Marengo et al., 2023). It creates pathways for adapting better teaching-learning pedagogies that bring a high level of engagement between teacher and students (Zhang & Zhang, 2024).

With continuous improvements in large language models, its capabilities are on the roll that will provide far more enhanced applications to be used in the education sector. AI Chatbot- ChatGPT (Chat Generative Pre-trained Transformer) is already revolutionizing the academic space on varied dimensions (Monib et al., 2025; Yigci et al., 2024). Currently it is one among many generative AI tools which is making learning more interactive and supportive with focused learning outcomes. With its human-like capabilities it assists in the teaching process and supports teachers in their class preparation, presentation, and reviewing (Alsafari et al., 2024).

ChatGPT brings productivity to the forth by utilizing time and effort in a constructive manner that makes lessons more creative and interactive (Javaid et al., 2023). It gives new grounds to researchers by covering the most recent areas and topics in a concise and accurate manner. This enables academicians to pursue their research in an organized manner and prompts them to structure their work around uncharted territories.

On the other hand, several issues have been reported regarding the disadvantages of AI adoption. The limitations of such services include bias, over-reliance, and problems related to academic integrity. Bias may arise from the nature of the training data, including cultural stereotypes and biases present in models like ChatGPT (Yuan et al., 2025). Over-reliance can result from dependence on personalized responses, emotional validation, and continuous engagement (Yankouskaya et al., 2025). Aca-

demetic integrity concerns are linked to various forms of misuse of AI tools during the writing and reviewing of academic work (Kwon, 2025).

The novelty of this study lies in examining how academic staff perceive and use ChatGPT. Until now, a significant portion of research has focused on students' use of this tool, whereas far fewer studies have investigated its use by faculty members. Notably, there has been multiple tools available for past few years that have proved helpful to faculty for grammatical/mathematical assistance, however none which can support in holistic teaching by assisting educators from beginning to end. Moreover, none of the existing literature on academic staff has applied Diffusion of Innovations theory. With this current gap it constitutes both the contribution and the novelty of the research.

## 2 Theoretical background

### 2.1 ChatGPT in academics

ChatGPT is increasingly helping academics and bringing innovative reforms at all levels of education creating new avenues for personal and professional development. Natural language processing tool that supports ChatGPT has made conversation with AI simple thus enabling support to thought process. Academicians are able to use this alignment and direction to make their work simpler, systematic and relevant (Borger et al., 2023). Day to day struggle of academics related to creating students' assignments and classroom exercises, their summary and feedback generation, project suggestions and their assessments are passed on to ChatGPT which provides more enhanced and clear support in these tasks (Parker et al., 2024). Bhaskar and Rana (2024) stated that in higher education institutions can prove beneficial as learning enhancement tool that can benefit the entire educational setting but not at the cost of hampering innovation and creativity among educators.

Research is a key entity of the academic world. In the extensive network of various research ideas, getting the right direction towards most relevant and sought after topics is the most crucial. Therefore, from the research viewpoint ChatGPT becomes very useful. Its use can facilitate innovation and provide many creative aspects for academics to make their work interesting (Bin-Nashwan et al., 2023). Notably, ChatGPT should be used as a tool to support the latest research ideas and understand various aspects of literature review. It is the work of researchers to design the relevant scale for collecting data by combing through various sources to extract the right literature, work on methodology that best supports the topic, analyze the results, write the conclusion and finally create an abstract of the manuscript. Seeking help of ChatGPT at all the stages of research work will lead to diminished writing and research skill, unstructured paraphrasing, lack of coercive reading, compromised academic integrity and repetition of thoughts throughout the manuscript (Rahman et al., 2023; Strzelecki, 2025a). Technology should be used to support language improvement and to make manuscripts more crisp and readable.

Recent studies highlight the importance of developing institutional policies, faculty training, and ongoing support to facilitate effective adoption and also underscore

the diversity of faculty perspectives, which can help tailor adoption strategies to different pedagogical contexts (Durmuş Sarıkahya et al., 2025). Some studies employ the quantitative methods based on the technology acceptance model to assess influence on ChatGPT adoption among faculty (Cambra-Fierro et al., 2025) or qualitative methods based on in-depth interviews (Mohamed, 2024). Bin-Nashwan et al. (2023) explored the advantages and pitfalls of ChatGPT amongst academicians. Using Social Cognitive Theory, they identified that academic integrity moderates time-saving, self-esteem and perceived stress for using ChatGPT. If correctly incorporated by academic institutions, it can enhance productivity amongst educators.

The onslaught of large language models has ensured that its adoption is making work more productive and interesting. Academic community has also welcomed ChatGPT to do both academic and non-academic tasks but still there are many more aspects where it can be adopted and used. With continuous upgradation and improvements in functionality of ChatGPT, very soon other tasks related to classroom and research work would be directed to it that would be free of plagiarism and repetition. The future holds scope for conducting experiments, testing frameworks and providing vernacular language support to academicians who struggle in publishing due to non-fluency in the English language.

## 2.2 Diffusion of innovations

Diffusion of Innovations theory helps in understanding why individuals seek or reject an innovative product or service. Rogers (2003) in his seminal work proposed that perception of an individual prompts them towards adopting innovation. The willingness and speed of adoption forms the crux of various attributes proposed in DOI namely relative advantage, compatibility, complexity, trialability, and observability.

The characteristics of innovative offering can be judged through various parameters. The decision process and its acceptance are in line with the novelty of innovation and its attributes. Literature shows that these attributes are also able to comprehend adoption scenarios for innovations in education (Al Shloul et al., 2024; ElSayary, 2023). Academic institutions thrive on new pedagogy, tools, ideas, and technological upgradation (Adtani et al., 2023).

Artificial intelligence is already a closely interwoven entity of academics with its continuously evolving intelligent technologies making adjustments in traditional patterns of education (Tahiru, 2021). The perception of adopters in regard to education innovation characteristics are linked to adopting new teaching pedagogies leading to transformation in teaching learning process. Though a lot of discussion is done on ChatGPT's performance in the education sector in regards to its advantages and disadvantages (Javaid et al., 2023), there is a shortage of studies in understanding academicians point of view with respect to its adoption and usage. There is no literature with DOI for understanding academicians' perspective in relation to ChatGPT. This formulates an interesting perspective to study. The research question is how and to what extent DOI elements influence adoption of ChatGPT by academicians?

Diffusion of Innovations theory is a useful way in these circumstances to understand why university faculty members choose to use ChatGPT. It highlights important factors - like how helpful the tool seems (relative advantage), whether it fits well with

existing practices (compatibility), how easy or hard it is to use (complexity), how simple it is to test out (trialability), and how visible its benefits are (observability).

Relative advantage may refer to the tool's ability to provide language translation and general language corpus services for academic writing. Compatibility may relate to its capacity to maintain scientific style and its knowledge of academic structures, including both curricula for students and manuscript formats. Complexity may refer to the availability of additional models offered by external providers, which, for example, can browse and utilize scientific databases or other sources. Trialability may involve the opportunity to refine tasks and receive similar outputs with slight variations. Observability may relate to the growing discourse on academic integrity in the context of generative AI tools, particularly regarding their use in writing, reviewing, and supporting other types of academic work.

By applying DOI, it can be seen more clearly what motivates academics to adopt ChatGPT and how it becomes part of their teaching and research routines. This theory also gives us practical insights into what might encourage (or discourage) the adoption of new technologies across higher education.

### 3 Methodology

#### 3.1 Hypothesis and proposed framework

##### 3.1.1 Relative advantage

Relative advantage is the additional benefits that individuals would derive from using the innovative product. The benefits may vary from quantitative to qualitative add-ons that could help in gaining edge over competition, acquiring more visibility, attaining societal acceptance and recognition, or securing economic advantage (Al-Mughairi & Bhaskar, 2024).

Academicians have understood the versatility of ChatGPT which can help in improving quality of research and classroom delivery. It can give fruitful results and can be useful in easing out time taking tasks like preparing activities, identifying tools of assessments and preparing framework of classroom delivery. Thus, its implementation can help the teachers to shift from traditional ways of teaching to more practical activity based styles of teaching (ElSayary, 2023). This would give them an additional advantage over peers in relation to better publications and good feedback from students. Various academic disciplines can take advantage of ChatGPT by involving it as a virtual assistant in a wide range of activities and to carry out academic tasks like question paper setting and creating class teaching and assessing material. ChatGPT would help in making lessons more interactive through use of realistic case studies that can create more student-class engagement and enhance their problem solving capabilities. Thus, we posit that:

**H1** Relative advantage influences academicians behavioral intention to use ChatGPT.

### 3.1.2 Compatibility

Compatibility reflects an individual's past experience in conjunction with present need and additional value enhancements (Acikgoz et al., 2023). DOI emphasizes that when an idea seems compatible, it lowers uncertain apprehensions and increases familiarity with innovative offerings (Ayanwale & Ndlovu, 2024). The alignment with compatibility heightens if it matches an individual's societal beliefs, upgradation of earlier offerings and acute need for innovative solutions.

Compatibility of technological innovation is more if it is considered as an extension from a cluster of interrelated bundles of technological elements that are already in use (Venkatesh et al., 2003). Almaiah et al. (2022) stated that compatibility can be defined as “the degree that institutions and users believe that AI can increase information systems' potential and enhance their performance”.

ChatGPT is a user-friendly AI tool that embraces numerous features in various domains covering all the paradigms of industry to make learning more interactive and productive. As it facilitates interaction with its users through conversations, the right set of questions, dialogues, prompts and scenarios along with right follow-up questions can make use of ChatGPT easy and learning interactive (Rospigliosi, 2023). In this wake we propose that:

**H2** Compatibility influences academicians behavioral intention towards ChatGPT.

### 3.1.3 Complexity

Complexity of an innovation is the difficulty that individuals associate with its functionality and reasoning. The walk from complexity to rationality for an innovation helps in the ease of its adoption and marks its success. Technological innovations extensively rely on tech savvy individuals at the start. But if the simplicity-rationality continuum is highlighted by the companies, adoption by others is quicker and becomes more widespread (Rogers, 2003).

Academics are looking at ChatGPT for educational rearrangement through the lens of teaching-learning transformation that can bring a substantial shift in the delivery, thus changing the teacher-student interface (Nissim & Simon, 2025). The ease of use of this complex large language tool has shifted the paradigm of conventional teaching to a more evolving and robust system of quality content and future usefulness (Alemdag, 2025). ChatGPT not only gives structural support but also enhances communication aspects. The simplicity of its use helps in solving complex scenarios/problems and makes users life easier through the lens of gaining confidence and self-reflection of their work. Through innovative tools various strategies can be designed for delivery and assessment by educators making the whole process fast, simple and reliable. Thus, it is proposed that:

**H3** Complexity influences academicians Behavioral Intention towards ChatGPT.

### 3.1.4 Trialability

Trialability refers to the experimentation phase, early adopters go through in order to understand the innovative offering. It is the trust that users show in the latest innovation that encourages them to use and adopt it. Based on the ease of trialability, the speed of adoption of innovation can be deciphered. In technological innovation, trialability proves to be a key determinant in understanding whether to adopt it or not (Lee et al., 2011). Trial innovation reduces uncertainty as they provide opportunity to users to learn through exploration and experience.

ChatGPT has already garnered a lot of attention from all the field and social media discourse is giving rave reviews about its trialability and success thereof. It has emerged as an intelligent tutor that gives customized support to academicians in their preparation and delivery (Monib et al., 2025). ChatGPT, if used wisely, can provide extensive support to academicians by providing both broad and comprehensive frameworks for multitude of academic activities (Elbanna & Armstrong, 2024). Academicians are trying to understand the thin line between plagiarism and innovative usage which can help them overcome various barriers of time, stress and innovative idea constructions (Tlili et al., 2023). Overall there is excitement about ChatGPT in the academic community and for both teachers and researchers alike.

**H4** Trialability influences academicians behavioral intention towards ChatGPT.

### 3.1.5 Observability

Observability is the visibility of results of the innovative offering that can be seen and analyzed by individuals to understand its importance. Societal acceptance is based on perception which is influenced by observation (Rogers, 2003). Depending on the degree of ease of observability and its communication to others the innovation garners adaptability by the society. Generally, the adopter's social groups like friends, colleagues, relatives etc. frequently seek their advice and feedback on the innovative offering in the market.

Observability in technological aspects especially with AI driven ChatGPT has changed the earlier notion that software is not easy to understand and accept (Al-kfairy, 2024). Within a very short span of time, ChatGPT has reached masses, a major reason being the comprehensive learning modality of even the most complex and technical topics through easy and understandable language (Kasneci et al., 2023). It provides a learning process where teachers can be mentors while the system acts as an information platform. Teachers have observed and understood that ChatGPT can be their supportive tutor that can relieve them of mundane jobs of assessments and they can channelise their energy in more productive intellectual processes (Annama-lai, 2024). This has elicited the acceptance of AI in the sphere of having a productive and fruitful work paradigm. Thus we propose that:

**H5** Observability influences academicians behavioral intention towards ChatGPT.

### 3.1.6 Behavioral intention

Willingness to adopt technology is influenced by many factors making an individual positively inclined towards understanding and exploring all the facets of latest technology. ElSayary (2023) in their study elaborated that ICT has increasingly inclined academicians and researchers to a whole new emerging societal aspect where academia wants to be part of AI and ICT driven *knowledge society*. AI stores a wealth of knowledge and ChatGPT is a simple and user friendly tool to extract that knowledge. This emerging knowledge society gives a platform to educationists for generating tailor-made, specially curated learning material for the students. With its user-friendly interface ChatGPT can provide cognitive scaffolding and enhance writing and linguistic skills of the students (Ayanwale & Ndlovu, 2024). This in turn would help educators to set better learning goals and create engaging and interesting activities for students to make education engaging and exciting (Zawacki-Richter et al., 2019). There is a continuous transition of academicians to learn new AI tools which can be instrumental in being more constructive and productive in their work (Su et al., 2022).

ChatGPT is a powerful tool that can build a two-way alignment between teacher and students and provide a bridge for a more collaborative and sustainable teaching program. The intersection of subject knowledge with the latest technological procedure in teaching pedagogy is one of the most lucrative attraction point for ChatGPT for the academicians. Behavioural intention is a construct drawn primarily from the Theory of Planned Behavior and Technology Acceptance Model. This study aim is to measure the adoption of generative AI, so we decided to include it in our model. Thus we posit that behavioral intention influences usage of ChatGPT.

**H6** Behavioral intention influences academicians to use ChatGPT.

### 3.1.7 Personal innovativeness

Personal innovativeness is an attitude which is reflected by an individual's keen interest in deciphering innovative offerings, generally forgoing perceived risks associated with. These individuals aspire to gain new experiences by consuming innovative offerings and have a strong sense of staying ahead of the lot by imbibing new practices or products. Personal innovativeness was introduced by Agarwal and Prasad (1998) and is often used as an extension to common theories. ChatGPT is the newest offering that is empowering people to come out of their limited resources or fixated mindset by exploring new horizons (Baber et al., 2024). As academics require continuous update of the information both in relation to research and academia, ChatGPT is proving to be efficacious in producing desired results in an easy, cohesive and understandable manner.

In the contemporary teaching scenario, academicians seeking facilitation and moderation for their work get more inclined towards technology (Al-Adwan et al., 2024). Therefore academicians seek ChatGPT as it reduces their workload, gives freedom from time-consuming activities like plagiarism checking and automates many administrative tasks like evaluation and scoring. Moreover, its role as a virtual



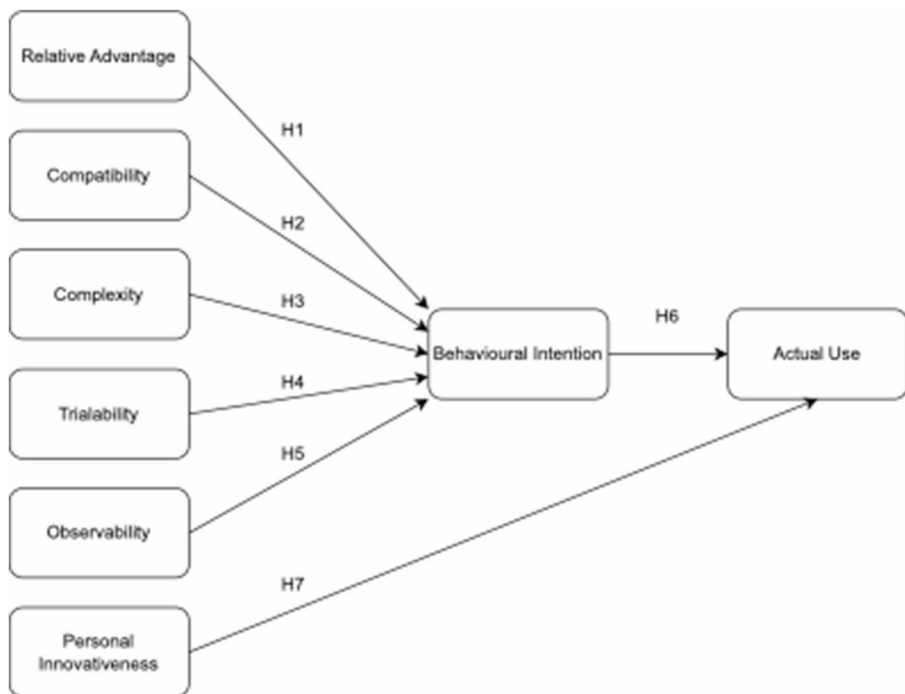
tutor for students is increasingly giving a new trajectory to students thereby making educators more inclined in getting suggestions and extra teaching and research material through AI assistance. Educators with an inclination to excel and try out better and engaging modes of teaching are quite acceptable towards ChatGPT (Lo, 2023). Thus, personal innovativeness in regards to ChatGPT gives an impetus to academicians to embrace this technological advancement in their pursuit of mastering new technology that can enhance their teaching pedagogy and classroom effectiveness (Al-Adwan et al., 2025). The state-of-the art model for DOI is extended by adding Personal Innovativeness. Thus we posit that:

**H7** Personal Innovativeness influences academicians to use ChatGPT.

Based on these considerations a conceptual framework for measuring adoption and use of ChatGPT by academicians with the use of IDT is proposed (Fig. 1).

### 3.2 Measurement instrument

This study uses the measurement scale developed in previous works (see Table 1). The DOI elements: relative advantage, compatibility, complexity, trialability, and observability are adopted from the Moore and Benbasat (1991) scale development. The personal innovativeness is adopted from Agarwal and Prasad (1998) and behavioral intention and actual use scale come from Venkatesh et al. (2012).



**Fig. 1** Conceptual model of acceptance and use of ChatGPT by academicians based on DOI

**Table 1** Measurement model and assessment

Constructs	Loadings	T statistic	VIF	Cronbach's Alpha	Composite Reliability	AVE
Relative advantage				0.937	0.948	0.841
ChatGPT meets the needs of scientists because it offers data analysis tools.	0.91	83.133	4.333			
The use of ChatGPT is in line with the needs of modern scientific research because it allows working with datasets	0.922	99.674	4.738			
The availability of ChatGPT responds to the needs of scientists because it helps speed up research processes and increases work efficiency	0.93	146.228	3.912			
ChatGPT meets the needs of scientists because it allows you to perform complex tasks quickly and easily	0.907	86.796	3.411			
Compatibility				0.812	0.824	0.723
I have the resources necessary to use ChatGPT	0.860	48.816	2.792			
I have the knowledge necessary to use ChatGPT	0.873	53.517	2.838			
ChatGPT is compatible with technologies I use	0.817	42.878	1.361			
Complexity				0.909	0.916	0.786
ChatGPT allows you to significantly shorten the time needed to receive research results (implementing a task, finding/formulating an answer to a task)	0.896	83.812	2.986			
Using ChatGPT allows you to solve complex problems faster and more precisely	0.92	124.11	3.702			
ChatGPT allows for more efficient processing and analysis of data sets in a short time	0.837	47.183	2.193			
With ChatGPT, scientists can produce better results, which improves the quality of their research	0.892	93.728	2.732			
Trialability				0.813	0.85	0.632
ChatGPT can be tested for free for a limited time	0.795	24.401	2.248			
There are free tools and training materials available to help you learn how to use ChatGPT	0.773	29.211	1.556			
ChatGPT offers a free trial option for a limited period of time to evaluate its effectiveness in solving your problems	0.8	24.789	2.291			
Because ChatGPT is available in the cloud (you don't have to install it on your own computer), it's easier to test	0.81	33.135	1.397			
Observability				0.749	0.769	0.572
The effectiveness of ChatGPT can be easily measured and evaluated by researchers	0.754	25.736	1.698			

**Table 1** (continued)

Constructs	Loadings	T statistic	VIF	Cronbach's Alpha	Composite Reliability	AVE
ChatGPT usage can be monitored in real time so you can observe its effectiveness	0.718	20.336	1.627			
Many scientific and research organizations publish articles and reports that present research results using ChatGPT	0.706	18.994	1.693			
ChatGPT is often used by well-known and respected scientific organizations, which makes its effectiveness easier to observe	0.84	47.606	1.961			
Behavioral Intention				0.880	0.896	0.807
I intend to continue using ChatGPT in the future	0.836	53.260	2.112			
I will always try to use ChatGPT in my academic work	0.949	244.354	4.128			
I plan to continue to use ChatGPT frequently	0.906	136.706	2.977			
Personal Innovativeness				0.927	0.929	0.821
I like experimenting with new information technologies	0.921	137.914	4.408			
If I heard about a new information technology, I would look for ways to experiment with it	0.927	134.338	4.650			
Among my family/friends, I am usually the first to try out new information technologies	0.873	69.026	2.586			
In general, I do not hesitate to try out new information technologies	0.903	78.266	3.225			
Actual Use						
Please choose your usage frequency for ChatGPT: Never; Once a month; Several times a month; Once a week; Several times a week; Once a day; Several times a day						

### 3.3 Sample characteristics

By the close of 2021, universities in Poland had a total of 99,950 academic staff members (RAD-on, 2023). To determine the appropriate sample size from this population, given a 95% confidence level and a 5% margin of error, we applied Yamane's (1967) formula:  $n = (z^2 * p * (1-p))/e^2$ .

In this formula,  $n$  is the required sample size,  $z$  is the z-score corresponding to the desired confidence level (1.96 for 95% confidence),  $p$  represents the estimated proportion of the population with the characteristic of interest (set at 0.5 to ensure the maximum sample size),  $e$  is the acceptable margin of error (0.05). Using these parameters, the minimum calculated sample size needed was 385.

An online survey was created using Google Docs and distributed to academics at ten major Polish universities: University of Szczecin, University of Zielona Góra, Nicolaus Copernicus University in Toruń, Jagiellonian University, University

of Rzeszów, University of Warsaw, Jan Kochanowski University in Kielce, University of Gdańsk, University of Łódź, and Adam Mickiewicz University in Poznań. Between April 25 and May 25, 2023, faculty members at these institutions were invited via email to participate.

Participants were assured of the confidentiality of their responses and informed that their participation was voluntary. We invited more than 4500 researchers to take part in the study and had a response rate 18%, collecting in one month 797 answers. 648 participants were using ChatGPT tool. The remaining participants began the study by answering the first question about their familiarity with or use of ChatGPT. Those who answered “no” were directed to the end of the survey, and their data were not collected in the analysis. After excluding eight responses due to zero variance, a total of 640 valid responses were collected, meeting the minimum required sample size. The demographic breakdown of the sample included 315 males (49.2%), 294 females (45.9%), and 31 individuals (4.9%) who preferred not to disclose their gender. The average age of respondents was 45.2 years ( $SD=10.4$ ), with a median age of 45 years.

To address potential common method bias (CMB), we implemented Harman’s single-factor test as recommended by Podsakoff et al. (2003). The analysis revealed that a single factor accounted for 35.32% of the total variance, which is below the 50% threshold suggested by MacKenzie and Podsakoff (2012). Therefore, CMB does not pose a significant concern in this study.

## 4 Results

### 4.1 Reflective measurement model assessment

All the constructs were checked for unidimensionality with the help of principal component analysis. All the items except one had the factor loadings more than 0.7. One item of Compatibility was dropped because its loading fell short of the threshold limit. Average Variance Extracted (AVE) of all the constructs were above 0.50. Cronbach’s Alpha (CA), and composite reliability (CR) of all the constructs met the requirements of having values above 0.70, and 0.80 respectively. Thus, as per Hair et al. (2017), the measurement model met the criteria established in the assessment of both reliability and validity.

The discriminant validity for the measurement model has been established with the help of both Fornell-Larcker and the HTMT criterion (Voorhees et al., 2016). Table 2 shows the average square roots of the construct’s AVE on the main diagonal and the correlations in the lower diagonals. Discriminant validity is established as per Fornell and Larcker (1981) as all the square roots of the construct’s AVE exceed the correlations of the constructs with other constructs,

Table 3 depicts HTMT representing the ratio between construct correlation to the within construct correlation. Henseler et al. (2015) stated that HTMT value for conceptually different constructs should be less than 0.85 and for conceptually similar constructs less than 0.90. The study matches the above criteria.

**Table 2** Fornell-Larcker criteria

	Actual Use	Behavioral Intention	Compatibility	Complexity	Observability	Personal Innovativeness	Relative Advantage	Triability
Actual Use								
Behavioral Intention	0.644	0.898						
Compatibility	0.48	0.384	0.85					
Complexity	0.366	0.639	0.214	0.886				
Observability	0.241	0.423	0.276	0.509	0.756			
Personal Innovativeness	0.437	0.41	0.486	0.231	0.176	0.906		
Relative Advantage	0.317	0.608	0.193	0.811	0.608	0.173	0.917	
Triability	0.376	0.339	0.548	0.234	0.379	0.423	0.266	0.795

**Table 3** HTMT

	Actual Use	Behavioral Intention	Compatibility	Complexity	Observability	Personal Innovativeness	Relative Advantage	Triability
Actual Use								
Behavioral Intention	0.679							
Compatibility	0.535	0.431						
Complexity	0.38	0.712	0.228					
Observability	0.279	0.515	0.35	0.607				
Personal Innovativeness	0.453	0.446	0.565	0.249	0.219			
Relative Advantage	0.322	0.663	0.194	0.875	0.717	0.182		
Triability	0.399	0.365	0.659	0.258	0.487	0.466	0.293	

## 4.2 Structural model assessment

Table 4 concludes that the common quality standards for composite modeling are met by the outer model with a moderate model fit - SRMR=0.072 for the saturated model and SRMR=0.067 for the estimated model.

Table 5 provides the assessment of the structural model fit and tests of all the seven research hypotheses. All but one hypothesis showed empirical support by means of substantial and statistically significant parameters with good model fit (see Fig. 2) (Sarstedt et al., 2022). Considering the endogenous construct of behavioral intention to use ChatGPT by the academicians the effect of complexity  $\beta=0.383$  (H3) proves to be highest followed by relative advantage  $\beta=0.240$  (H1), compatibility  $\beta=0.214$  (H2) and finally trialability  $\beta=0.071$  (H4). The results of hypothesis H5 show that there is no significant nor substantial effect of observability on behavioral intention ( $\beta = -0.004$ ,  $p=0.872$ ). For the endogenous variable actual use, behavioral intention exerts a positive and significant effect ( $\beta=0.558$ ) (H6) followed by personal innovativeness  $\beta=0.209$  (H7).

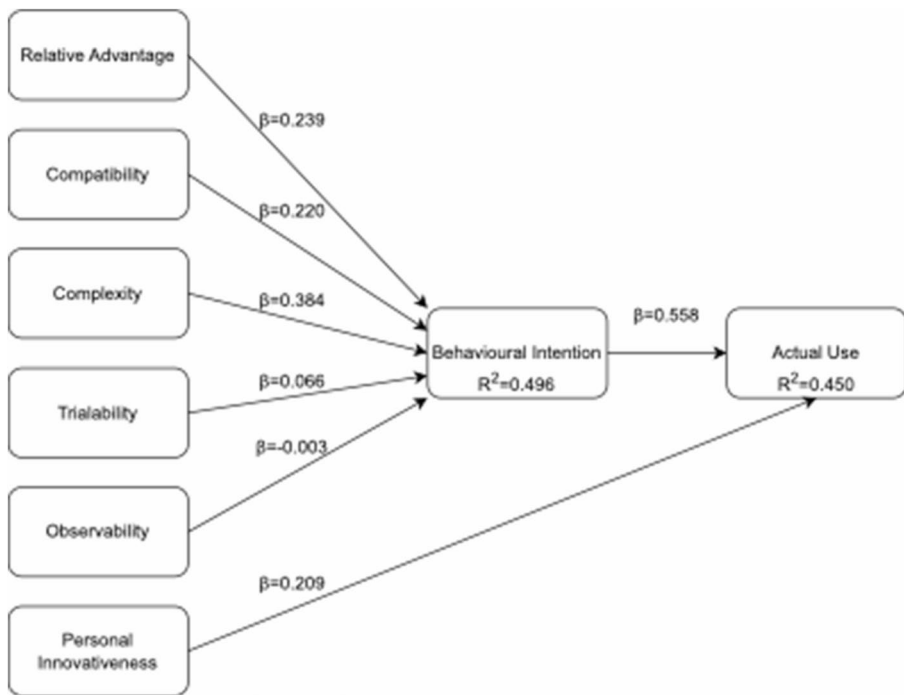
In the model, we obtained the following  $R^2$  values: for behavioural intention,  $R^2 = 0.496$ , and for use,  $R^2 = 0.450$ . This means that our model explains 49.6% of the variance in the intention to use AI tool among faculty members, and 45% of the variance in their actual use of this tool.

**Table 4** Structural model fit

	Saturated model	Estimated model
SRMR	0.067	0.072
d_ULS	1.695	1.975
d_G	0.556	0.584
Chi-square	2194.747	2278.686
NFI	0.832	0.826

**Table 5** Structural model and hypotheses tests

Coefficient	Path Coefficient β values (SD)	T-Statistics	P-Values	VIF	f <sup>2</sup>	Hypothesis	
Relative Advantage -> Behavioural Intention	0.240 (0.059)	4.125	0.000	***	3.454	0.020	H1
Compatibility -> Behavioural Intention	0.214 (0.034)	6.316	0.000	***	1.455	0.107	H2
Complexity -> Behavioural Intention	0.383 (0.053)	7.261	0.000	***	2.955	0.067	H3
Triability ->Behavioural Intention	0.071 (0.035)	2.003	0.045	**	1.557	0.046	H4
Observability -> Behavioural Intention	-0.004	0.161	0.872		1.732	0.000	H5
Behavioural Intention ->Actual Use	0.558 (17.64)	17.64	0.000	***	1.202	0.470	H6
Personal Innovativeness ->Actual Use	0.209 (0.030)	6.989	0.000	***	1.202	0.067	H7



**Fig. 2** Results of PLS-SEM evaluation

Finally, as per Cohen (2013, pp. 410–414) we checked  $f^2$  to determine the effect that exogenous variables have on endogenous variables i.e. small (0.02), medium (0.15), or large (0.35). The results of  $f^2$  for our model reveals that behavioural intention ( $f^2=0.47$ ) has the strongest effect on actual use. In line with the path coefficient value of observability, its  $f^2$  shows no effect on behavioral intention (0.000).

Concluding the results, academicians are getting inclined towards ChatGPT due to its potential to reduce complexity. Interestingly it gets well with how this innovation not only provides relative advantage in both academic and research oriented tasks but will also prove compatible to understand and use. Notably an academicians' personal innovativeness especially in terms of advances in technological adoption proves to be a major breakthrough that can create better and more productive avenues for academicians to explore and become more productive.

## 5 Discussion

In discussing the results obtained from our study, it is important to highlight that, to date, very few research papers have utilized the Diffusion of Innovations (DOI) theory model to examine the adoption of ChatGPT. To the best of the authors' knowledge, there are no studies investigating how the application of the DOI model on a sample of researchers, scientists, or academics yields results in the context of ChatGPT adoption. In the current literature, two peer-reviewed articles employ the DOI



model on a sample of students (Abdalla et al., 2024; Raman et al., 2024). This means that, so far, only two studies have applied the DOI model in the context of AI tools supporting academic work, but on students' level.

Another point to emphasize when discussing the results is that very few scientific works address how university faculty members use this tool. Among them are studies based on the UTAUT model (Strzelecki et al., 2024), the adapted or extended TAM model (Bhaskar et al., 2024; Cambra-Fierro et al., 2025; Kong et al., 2024), and the Social Cognitive Theory model (Bin-Nashwan et al., 2023). Hundreds of published works over the past two years have focused on student samples. This is due to the ease of obtaining data, as university employees have quick access to this research sample and can collect information from students with appropriate consent. Such research works using student samples are numerous; among those fundamental in this area are Strzelecki and ElArabawy (2024), Salifu et al. (2024), Mohamed (2025), Abbas et al. (2024), Chopra et al. (2025), and the latest global study (Ravšelj et al., 2025). Additionally, systematic literature reviews have examined many available articles written based on student samples using various theories, mainly UTAUT or TAM and their extended variants (Baig & Yadegaridehkordi, 2024; Chen et al., 2024; Lo et al., 2024). Therefore, the discussion of the findings in this study is pioneering, and the results will be compared to works closely related to the Diffusion of Innovations theory. Consistent with our hypotheses, the perceived relative advantage, compatibility, and complexity of ChatGPT significantly predicted faculty members' behavioural intention to use the tool. In contrast, trialability and observability did not reach statistical significance.

Relative advantage refers to the extent to which ChatGPT is perceived as beneficial for conducting academic work compared to other technologies used for this purpose. For example, ChatGPT can serve as a source of fundamental information on various research fields without the need for specific information sources. Moreover, ChatGPT can assist researchers by suggesting a fine-tuned GPT model tailored to their research profile. Our results support the general trend that ChatGPT is perceived as an innovative tool among academics, and they are cautiously using it to carry out their research tasks. Thus, we confirmed the hypothesis about the influence of relative advantage on the intention to use ChatGPT ( $H1: \beta = 0.240, p = 0.000$ ). The strong relationship between relative advantage and behavioral intention may stem from the tool's ability to analyze data, work with datasets, accelerate common research tasks, increase work efficiency, and perform repetitive tasks more effectively.

Compatibility is another important element of innovation that meets users' expectations regarding new technology. As observed, ChatGPT successfully processes various types of data inputted into it, both in text form and as documents. This impacts various sectors, including academia. Undoubtedly, proper compatibility with technologies previously used by researchers is perceived positively because ChatGPT, as a tool that can support the analysis of these data and documents, proves beneficial in conducting academic work. Hypothesis 2 was confirmed, establishing that compatibility has a significant influence on the intention to use ChatGPT ( $H2: \beta = 0.214, p = 0.000$ ).

The strong relationship between compatibility and behavioural intention may be due to the fact that faculty members are usually digitally literate and have access to

resources, often institutional, that enable them to work closely with new technologies. They also possess sufficient knowledge of what new technologies are capable of and have experience from using previous technologies.

The DOI theory emphasizes that complexity, or the ease of use or level of difficulty, is a key factor influencing how technology is adopted. The results of this study show that ChatGPT can facilitate result development, accelerate the research process, and its complexity is not so great as to be an obstacle in its use. The findings indicate a positive and significant influence of complexity on the intention to use ChatGPT ( $H3: \beta = 0.383, p = 0.000$ ). This underscores that both the user interface and key functions allow for easy initiation of work with this tool, supporting tasks in research.

The strong relationship between complexity and behavioural intention may be due to the significant reduction in time required for various tasks that faculty members can accomplish using the AI tool. The tool also enables users to solve complex problems, process data, improve language, and can serve as a fact-checker, preliminary reviewer, or augmented peer.

Trialability is the next key component of the DOI theory. In the case of ChatGPT, this means that the service can be tried without incurring additional costs before regular use. ChatGPT offers two versions: a free version with limited capabilities and a paid version with full features. The limited version provides access to less complex language models and restricts the number of prompts and document uploads. The paid version removes these limitations, allowing use of the latest, most complex language models and unrestricted file uploads. Our study found that the ability to use the free version is significant for respondents, as it allows them to assess the tool's functionality and usefulness in future research work ( $H4: \beta = 0.071, p = 0.045$ ). However, it should be noted that the path coefficient is relatively low, and while the effect on usage intention is statistically significant, it is minimal. In other studies, this factor is varied. Some results show that the cost of using ChatGPT matters, while others find it insignificant, possibly because the tool can be used for free in a limited scope (Foroughi et al., 2023; Romero-Rodríguez et al., 2023). This aligns with the "Price Value" variable in the UTAUT theory, where cost is considered or replaced with "Learning Value" (Sitar-Taut & Mican, 2021).

The non-significant path from trialability to intention is surprising given prior work that identifies trialability as a key determinant in technology adoption (Lee et al., 2011). One plausible explanation lies in the nature of ChatGPT itself: unlike tangible devices, AI chatbots can be accessed instantly and free of charge through web browsers. The low cost and high accessibility may have reduced the perceived need for a formal trial period, thereby diminishing its influence on intention.

Regarding the last element present in the DOI theory, observability is the only variable whose influence was not confirmed in our study ( $H5: \beta = -0.004, p = 0.872$ ). It appears that observability and its impact on the intention to use this tool in research work are insignificant. These results are in line with prior studies (Al-Rahmi et al., 2019; Lee et al., 2011) dealing with observability in technological adaptation where they found that the users might observe other users to understand the operation, but they might not find them useful in easing off their workload. In the education field, researchers prefer to independently verify whether the tool will be effective in their work. Publishing research papers based on the tool's results or materials encouraging

its use will not convince a researcher to adopt it. Other motivations, such as the desire to personally assess whether such a tool can support their work, are more influential.

Observability, defined as the visibility of an innovation's outcomes (Rogers, 2003), was also unrelated to intention. In higher-education settings, the benefits of AI assistance may be subtle or internalised (e.g., improved drafting speed) rather than externally visible. Faculty members often work in silos and may not openly share their use of ChatGPT with peers; consequently, observable effects remain limited.

Behavioral intention is a key element in earlier UTAUT and TAM theories, serving as a latent variable that helps explain the extent to which users of new technology express their intention to use it. In the context of the DOI theory, the five previously discussed elements are explanatory variables of the intention to use ChatGPT. We added the actual use of the service to the model, derived from the UTAUT2 model, which explains the actual use of the service. We measured this influence using Hypothesis 6, stating that behavioral intention has a positive influence on actual use, which was positively verified in our model (H6:  $\beta=0.558$ ,  $p=0.000$ ).

The DOI model in this study was expanded to include the variable of personal innovativeness, as initiated by Agarwal and Prasad (1998). This variable determines the willingness with which a user adopts new technology due to self-development desires, curiosity about its functionality, or a propensity to experiment. They are not hesitant to explore whether new solutions will be useful. We tested the hypothesis that personal innovativeness influences the actual use of ChatGPT. The results show that this assumption is positively verified, with the path coefficient for Hypothesis 7 being significant (H7:  $\beta=0.209$ ,  $p=0.000$ ). This result is in line with prior study of Strzelecki (2025b).

## 5.1 Theoretical implications

A practical contribution of the study lies in the fact that, to the best of our knowledge, it is the first research to consider DOI theory in relation to a generative artificial intelligence model. In this case, the technology was introduced by OpenAI in the form of ChatGPT, with its diffusion occurring through academic staff at higher education institutions. Since this tool was published and gained popularity, it has been used by both faculty members and students. Consequently, faculty must understand how these tools function in order to meet students' expectations.

## 5.2 Practical implications

Academic staff should be knowledgeable about how AI models generate text, images, audio, and video, and how to do so in accordance with current policies governing these tools. Such policies are issued by universities, national and supranational bodies, and must also align with ethical standards. A further practical contribution of our research is that, since ChatGPT was made available, competing companies have released other language models offering similar functionality, and these have likewise gained popularity. This trend indicates that generative AI tools are increasingly used in both teaching and research, as well as in data analysis. Hence, it is recommended to stay informed about the capabilities of such tools and to understand both their advantages and disadvantages.

### 5.3 Limitations

Two main limitations were identified in our research. The first concerns a lack of awareness about the actual capabilities of these tools and, more broadly, a lack of knowledge that they exist and contain extensive databases. Our survey assumed that academic staff were already somewhat familiar with ChatGPT and had used it at least once. However, we found that not all participants had actually tried the tool for various reasons, such as not needing it for their work, not having received any recommendation to use it, not having enough time to test it, or being skeptical about it. Consequently, some respondents were uncertain about their attitude toward ChatGPT, which means their involvement in diffusing this innovation is not significant.

The second limitation of our study is that we did not categorize academic staff based on their research areas. We neither grouped respondents by field of study nor asked about their specific expertise or teaching subjects. Consequently, we were unable to determine whether, for example, there would be any differences in the results between faculty members teaching social sciences and those teaching life sciences. Such a comparative analysis might have produced more nuanced insights.

## 6 Conclusions

This study has shown that the adoption of ChatGPT by academic staff in Polish universities is largely governed by the classic diffusion-of-innovation attributes—relative advantage, compatibility and perceived complexity—as well as by individual innovativeness. Behavioural intention mediates the relationship between these antecedents and actual usage, accounting for nearly half of the variance in faculty engagement with the tool. The non-significant role of observability suggests that faculty evaluate ChatGPT's value privately rather than through peer demonstration. Overall, the findings confirm that even in a rapidly evolving AI landscape, DOI remains a valid explanatory framework, while personal innovativeness adds an important individual-difference dimension that explains residual variation in actual use. These results provide a clear roadmap for institutions seeking to accelerate the diffusion of generative-AI technologies: emphasize tangible benefits and ease of integration, offer low-risk trial experiences, and support faculty who are less inclined to experiment with new tools.

**Data availability** The data that support the findings of this study are available from the corresponding author upon reasonable request.

### Declarations

**Conflict of interest** The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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