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Article

Predicting the interrelationships among Chat GPT, tourist's satisfaction and usage intention: Moderating role of traditional tour operator services

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Abstract: This study aims at predicting the interrelationship between among Chat GPT with its six dimensions, tourist's satisfaction and Chat GPT usage intention as perceived by tourist, and as well as to examine the moderating effect of traditional tour operator services on the relationships between all the variables. Data were collected from 624 tourists. The study hypotheses were tested and the direct and indirect effects between variables were examined using the PLS-SEM. The SEM results showed that Chat GPT's six dimensions have a positive and significant direct impact on tourist's satisfaction, and emphasis the moderating role of Traditional Tour Operator Services "TTOS" on the relationship between GPT's six dimensions and "TS", and on the relationship between 'TS" and Chat GPT usage intention. These findings yield valuable insights for everyone interested in the use of IT in the tourism industry, and provide effective strategies for optimizing the use of technological applications by traditional tour operators.

Keywords: Chat GPT; traditional tour operator services; tourist's satisfaction; AI usage intention; tourism industry

1. Introduction

The tourism industry has witnessed a significant increase in the use of technology in recent years. With advancements in communication tools and customer service platforms, the role of technology in enhancing tourists' experiences cannot be overlooked (Topsakal et al, 2022). Especially with technology integration, tourism has undergone significant transformations from production to presentation and after-sales evaluations, and technology has started to play an essential role in the tourism experience (Çolak, 2023). One such technological innovation that has gained prominence is Chat GPT (Generative Pre-trained Transformer). This language model system utilizes artificial intelligence to provide real-time automated responses to user queries, thereby improving customer service and communication (Edwards, 2023; Mearian, 2023).

In the tourism industry, artificial intelligence applications can be a useful tool for encouraging experiencing service consumption. Chabot's, for instance, can give customers vivid descriptions of various services in real time and further answer consumers' questions about the services they can't readily experience. Thus, pre-purchase interaction with AI-Chabot's can be very advantageous for tourists and hotel guests (Jin and Youn, 2023).

However, many tourists encounter issues and challenges when looking for hotels or entertainment venues that are appropriate for them. Travel planning has evolved as

a result of technology improvements. Therefore, Chabot's are one of the most recent technical innovations that have benefited tourism (Alotaibi et al., 2020). Tourist's satisfaction and their subsequent intention to use this tool can be influenced by multiple factors. One such factor is the services provided by traditional tour operators. These services, due to their established nature and human touch, often set the benchmark for customer satisfaction in the tourism industry (Bin-Nashwan et al., 2023).

So that this study aims at predicting the interrelationship between among chat GPT with its six dimensions (GPT Perceived Ease of Use; GPT Perceived Utility; GPT Service Quality; GPT Perceived Trust; GPT Perceived Hedonic; and GPT Anthropomorphism), tourist's satisfaction and chat GPT usage intention as perceived by tourist. In addition, to examine the moderating role of traditional tour operator services on the relationship between GPT's six dimensions and tourist's satisfaction, and between tourist's satisfaction and chat GPT usage intention.

2. Theoretical background and hypothesis development

2.1. GPT's six dimensions

Understanding tourist perception and satisfaction with Chat GPT requires a deeper analysis of its six dimensions: perceived ease of use, perceived utility, service quality, perceived trust, perceived hedonic, and Anthropomorphism. In the following lines, we will explore each dimension individually to gain insights into how they contribute to the overall tourist experience with Chat GPT.

2.1.1. GPT perceived ease of use

Customers' perception of a technology's ease of use can be defined as how effortless and convenient they feel to use (Stocchi et al., 2019). Additionally, perceived ease of use is defined by Keni (2020) as customers' assessment of how simple it will be to understand and use the technology they are about to deploy. Studies have shown that when users find a system easy to use, their satisfaction levels increase significantly (Ferreira et al., 2020). For example, if users or tourists can quickly understand how to input their queries or receive prompt responses from Chat GPT without any technical difficulties or confusion regarding interaction methods (Yilmaz et al., 2023).

2.1.2. GPT perceived utility

The main focus of perceived utility is the value or utility that GPT offers to its customers. Users want Chat GPT to successfully and efficiently serve their individual demands when they connect with it. Because it is closely correlated with achieving users' expectations, the impression of utility affects user satisfaction (Farhi et al., 2023; Kanwal, 2023). ChatGPT's perceived utility for tourists is multi-faceted. Notably, it can offer enhanced customer interaction, assist with decision-making, and provide a personalized travel experience. It can help tourists during their initial planning stages all through to the actual trip itself (ÇOLAK, 2023). GPT can also be used as a tool to offer personalized travel recommendations based on users' preferences. Furthermore, GPT can comprehend and reply to queries around-the-clock, which boost productivity by managing several requests at once (Ali et al., 2023).

With these kinds of powers, it makes a big difference in improving the travel experience in general and boosting the tourism sector (ÇOLAK, 2023).

2.1.3. GPT service quality

Service quality in the context of Chat GPT pertains to various factors that impact users' assessment of the overall quality provided by the system during interactions. These factors include response accuracy and relevancy compared to user queries; reliability concerning consistent availability; personalization capabilities based on individual preferences; security measures protecting sensitive information, and privacy safeguards (Subagja et al., 2023). When Chat GPT delivers high service quality, users are more likely to perceive it positively and have a satisfactory experience (Kalla and Smith, 2023). ChatGPT's service quality can greatly benefit tourists in the tourism industry. It offers enhanced customer interaction, enabling more effective decision-making and personalized travel experiences (ÇOLAK, 2023). GPT is a very creative AI technology that influences learning outcomes, perceived value, and innovativeness in addition to helping process data and creates solutions (Ara, 2023). Its capacity to address consumer grievances and conduct online reviews is gaining traction as a useful tool for managing service outages and enhancing the customer experience in general (Koc et al., 2023). Therefore, the use of GPT can significantly enhance the service quality provided to tourists.

2.1.4. GPT perceived trust

Perceived trust is crucial for user acceptance and engagement with Chat GPT. Users need to feel confident that the system will handle their queries ethically, reliably, and securely. Factors such as transparency in data handling practices, clear communication of limitations or biases of the model, responsiveness to user concerns or feedback contribute significantly to establishing trust in Chat GPT (Choudhury and Shamszare, 2023). By building trust with users, Chat GPT can foster long-term engagement and positive user experiences (George and George, 2023). ChatGPT's ability to provide tailored trip suggestions can be very helpful to the tourist sector. However, the precision and dependability of ChatGPT's responses have a major impact on how much tourists believe its advice. For example, if the knowledge base that GPT utilizes to produce suggestions is outdated or contains for example, the advice generated by GPT may be unreliable and wrong if the underlying knowledge base it uses to generate suggestions is outdated or contains inaccurate information. This could lead to a decline in the perceived trust that tourists have towards the AI-based system (ÇOLAK, 2023). Therefore, while GPT has promising potential to revolutionize decision-making in tourism, building and maintaining trust among tourists is critical. This involves ensuring the accuracy of information provided and addressing any concerns users might have about interacting with AI systems (Ali et al., 2023; Kim et al., 2023; Wong et al., 2023).

2.1.5. GPT perceived hedonic

The emotional components of utilizing Chat GPT that affect users' happiness or enjoyment during exchanges are referred to as perceived hedonic features (Paul et al. 2023; Skjuve et al., 2023). It consists of elements like humor, empathy, storytelling prowess, or system-integrated characteristics that generate interesting discussion (Zhai

and Wibowo, 2022). Individuals who love interacting with Chat GPT are more likely to use it frequently and refer others to it (Cai et al., 2023; Menon and Shilpa, 2023). The perceived hedonic value of ChatGPT for tourists in the realm of tourism can be likened to a virtual tour guide. It is the equivalent of having a personal assistant that not only offers useful and detailed information, but also adds an aspect of entertainment and creativity to the interaction, thus enhancing the overall experience (Kim et al., 2023; Skjuve et al., 2023). However, as with every tour guide, the quality of information provided is crucial. If the AI gives incorrect answers or recommendations, it can negatively influence a tourist's decision-making process (Kim et al., 2023).

2.1.6. GPT anthropomorphism

The attribution of distinctly human-like emotions, thoughts, and behaviors to inanimate objects, animals, and generally to natural events and supernatural beings is known as anthropomorphism (Salles et al., 2020). When it comes to conversational abilities, GPT is human-like. According to Sohail et al. (2023), Wang et al. (2023), and Faruk et al. (2023), it can replicate human-like text production, understand complicated contexts, express emotions, and employ sarcasm. All of these abilities help to make user interactions more relatable and lifelike. Based on this, the authors would want to define GPT Anthropomorphism as the extent to which users believe an AI system to possess human-like traits, such as the capacity for casual or human-like language use, empathy, understanding emotions, and a sense of humor. These features have the potential to enhance user engagement and comfort during system interactions. These features have the potential to enhance user engagement and comfort during system interactions. Anthropomorphism in Chat GPT enhances the tourist experience with human-like interaction. It understands and generates responses like a human, providing personalized travel recommendations. The success of anthropomorphism depends on user interactivity and enjoyment, with extroverted individuals benefiting the most. Overall, ChatGPT significantly enhances the travel experience (Ali et al, 2023; Kim et al., 2023).

2.2. Tourist's satisfaction

According to Braimah et al. (2024), tourist satisfaction is defined as "a collection of tourists' attitudes about specific domains in their vacation experience." Bayih and Singh (2020) further define it as a reaction or decision made by tourists based on emotion or cognition. Zeng and Yi Man Li (2021) further define satisfaction as the extent to which travelers' expectations and actual experiences are met. Visitors will evaluate how well their expectations are fulfilled. Visitor satisfaction is based on the general perception of each destination's quality among travelers. Traveler expectations are influenced by a number of elements, such as needs, goals, experience, recommendations from friends, and marketing material. Tourist satisfaction is influenced by pre-trip expectations and post-trip experiences (Fatmawati and Olga, 2023).

2.3. Chat GPT usage intention

The term "usage intention" describes a person's propensity or readiness to

employ a specific digital evaluation system (Dehghani, 2018). According to Chang (2020), there are several aspects that influence this purpose in the current context, such as the technology's perceived utility, simplicity of use, and level of trust. The tourism industry could see a significant transformation in the way travelers obtain information, make reservations, and request assistance while traveling if Chat GPT is used. This is because people are becoming more demanding of tailored and effective interactions (Gursoy et al., 2023).

2.4. Relationship between Chat GPT usage intention and tourist satisfaction

It is possible to view the relationship between the intention to use Chat GPT and visitor happiness as mutually beneficial. Research by Chen (2020) and Cempena et al. (2021) has demonstrated a direct relationship between the intentions of tourists to use technology and their level of satisfaction. Tourists' inclination to embrace novel solutions like as Chat GPT is directly influenced by their degree of satisfaction. Studies conducted in the tourism sector have shown that visitors who are happy are more likely than unhappy or indifferent travelers to want to employ AI-powered chatbots when they travel (Lee and Lee, 2021). Additionally, a loop of positive feedback can be created by high visitor satisfaction ratings and higher intention to use Chat GPT (Gursoy et al., 2023). It should be highlighted, nonetheless, that this link might be impacted by how accurate the data provided by Chat GPT is (Jo, 2023). Both usage intention and visitor happiness may be negatively impacted by inaccurate or deceptive information. These findings have important ramifications for the travel and tourism sector. Companies in this industry can use consumer happiness as a catalyst to encourage the use of cutting-edge technology as Chat GPT (Arman and Lamiya, 2023). By concentrating on providing outstanding service quality, developing appealing locations, and successfully accommodating a range of preferences, businesses can foster high levels of visitor happiness, which in turn translates into a rise in the use of Chabot services (Ali et al., 2021).

2.5. The moderating role of TTOS

TTOS can play a moderating role between ChatGPT and tourists' satisfaction by enhancing the AI's recommendations with their expertise and personalized touch. While ChatGPT, a generative AI, can provide quick and customized information to tourists, the human aspect of traditional tour operators can add value by providing context, understanding nuanced preferences, and offering personalized guidance. They can cross-verify the information generated by ChatGPT, correct any inaccuracies, and thus enhance the overall satisfaction of tourists. This blend of AI technology and human touch can cater to diverse tourist needs and lead to high satisfaction levels (Fareed, 2023; Liu et al., 2023). When it comes to mediating the relationship between tourists' satisfaction and their inclination to use Chat GPT, tour operators are essential. Tour operators, being the main organizers of visitor experiences, can use Chat GPT to expedite correspondence, offer customized suggestions, and promptly resolve visitor complaints. Tour operators can boost customer satisfaction and positive word-of-mouth referrals by including Chat GPT

into their service delivery. This will improve the overall quality of interactions with tourists (Choi and Kim, 2020). Furthermore, tour operators can use Chat GPT to gather valuable insights into tourists' preferences and behavior, enabling them to customize offerings and create personalized experiences that align with tourists' expectations. In conclusion, the utilization of Chat GPT in the tourism industry has the potential to significantly impact tourist satisfaction. The interactive and personalized nature of Chat GPT interactions can enhance tourists' overall experience, with tour operators playing a pivotal role in mediating this relationship. As technology continues to shape the tourism landscape, the integration of Chat GPT by tour operators represents a promising avenue for improving customer satisfaction and delivering exceptional travel experiences.

Based on the previous discussions of comprehensive literature, the following hypotheses can be proposed:

H1: Chat GPT Perceived Ease of Use have a direct significant impact on Tourist Satisfaction.

H2: Chat GPT Perceived Utility have a direct significant impact on Tourist Satisfaction.

H3: Chat GPT Service Quality have a direct significant impact on Tourist Satisfaction.

H4: Chat GPT Perceived Trust have a direct significant impact on Tourist Satisfaction.

H5: Chat GPT Perceived Hedonic have a direct significant impact on Tourist Satisfaction.

H6: Chat GPT Anthropomorphism have a direct significant impact Tourist Satisfaction.

H7: Tourist Satisfaction have a direct significant impact on Chat GPT Usage Intention.

H8: Traditional Tour Operator Services will moderate the relationship between Tourist Satisfaction and Chat GPT Ease of Use.

H9: Traditional Tour Operator Services will moderate the relationship between Chat GPT Perceived Utility and Tourist Satisfaction.

H10: Traditional Tour Operator Services will moderate the relationship between Chat GPT Service Quality and Tourist Satisfaction.

H11: Traditional Tour Operator Services will moderate the relationship between Chat GPT Perceived Trust and Tourist Satisfaction.

H12: Traditional Tour Operator Services will moderate the relationship between Chat GPT Perceived Hedonic and Tourist Satisfaction.

H13: Traditional Tour Operator Services will moderate the relationship between Chat GPT Anthropomorphism and Tourist Satisfaction.

H14: Traditional Tour Operator Services will moderate the relationship between Tourist Satisfaction and Chat GPT Usage Intention.

All suggested interrelationships between variables can be shown at **Figure 1**.

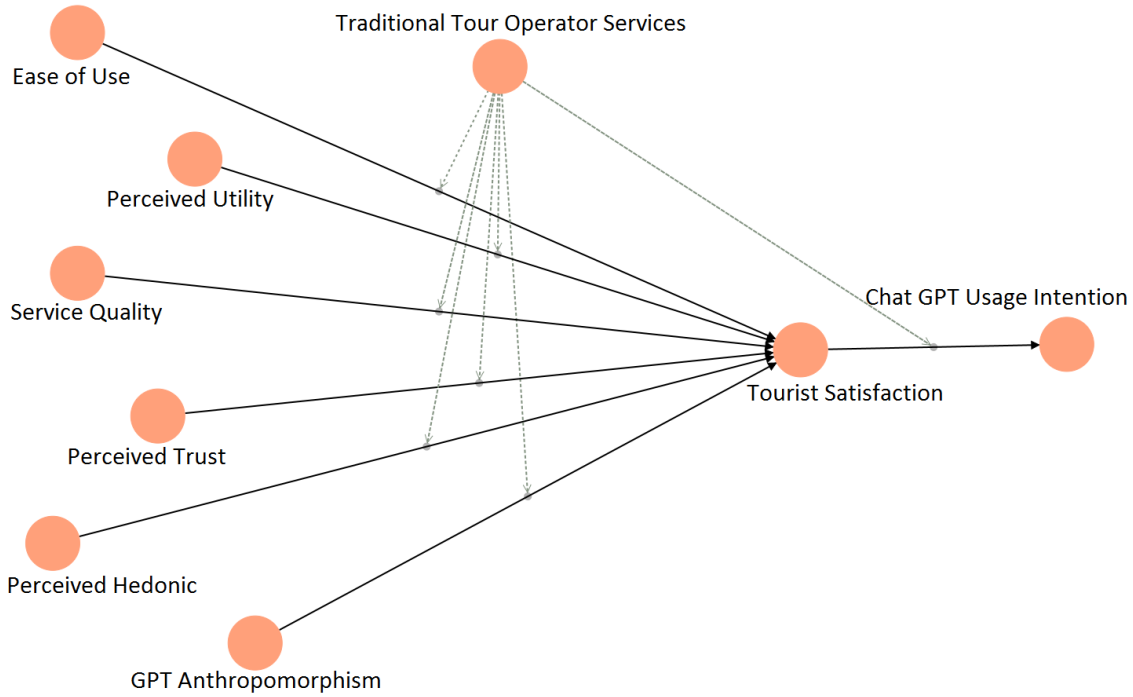

Figure 1. The suggested theoretical model.

3. Methodology: (Materials and methods)

3.1. The scale and the study constructs

The utilized scale to measure variables of the current study were derived from the literature reviews. The chat GPT perceived ease of use "GPT-PEU" where measured by 4 items, adopted from Pillai and Sivathanu (2020) and Chat GPT Perceived Utility "GPT-PU" was measured by 3 items, derived from Ashfaq et al. (2020). As for Chat GPT service quality "GPT-SQ", it was measured by 5 items, derived from Ashfaq et al. (2020), while Chat GPT perceived trust "GPT-PT", it was measured by 4 items, adopted from Pillai and Sivathanu (2020). Regarding Chat GPT perceived hedonic "GPT-PH", it was measured by 3 items, derived from Venkatesh et al. (2012), and for chat GPT Anthropomorphism "GPT-AN", it was measured by 4 items, adopted from Melián-González et al. (2021). Regarding Chat GPT usage intention "GPT-UI", it was measured by 5 items, adopted from López et al. (2011) and Venkatesh et al. (2012). As for tourist's satisfaction "TS", it was measured by 6 items, adopted from Chung et al. (2018). Finally, traditional tour operator services "TTOS" were measured by 3 items, adopted from Pillai and Sivathanu (2020). What supports the validity of choosing this scale is that all variables' scale showed high reliability values above 0.90.

3.2. Population and sample size

Tourists are the target population for the study, and according to Egypt's Central Agency for Public Mobilization and Statistics, the number of tourists who visited Egypt during 2022 was 11.7 million (CAPMAS, 2023), and by using sample size formula of Herbert Larkin to determine the sample size of this study, the suitable representing sample size is 384 individuals (Ayad, 2017).

3.3. Data collection

A quantitative approach with a self-administrated questionnaire was adopted for the current study to acquire primary data from tourists. A group of tourism experts and professors reviewed and modified the questionnaire, the questionnaire was directed to 635 tourists, during the months of January, February, March and April 2023, and the final outcome of the number of completed and statistically analyzed questionnaires was 624, with a response rate of 98.3%. Authors got a high response rate due to their good relationship with many tour operators, as a large number of the employees in these tour operators are our former students, which helped in reaching this number of tourists and distributing the questionnaire to them. The distribution of the questionnaire was limited to tourists who revealed that they had already used Chat-GPT to plan their vacations and travel arrangements, and even to make some decisions while they were in the tourist destination. The questionnaire is composed of seven parts to meet the objectives of this study. The first part of the questionnaire was for demographic data, while the remaining six parts were for the six variables investigated in this study, which are tourist guides' professional competencies; service quality of tour guiding services; tourists' satisfaction; tourists' loyalty; destination image; and tourism sustainable development. The respondents were asked to assess all items of each variable on a 5-point Likert scale.

3.4. Analysis techniques

The statistical package SPSSvs24 and Excel Sheet 2010 were utilized to analyze the descriptive data and explore the demographic features of the sample of the study. Moreover, the structural equation modeling (PLS-SEM V.4) was used to examine the interrelationships between all variables and to test the research hypotheses.

4. Analysis and results

4.1. Measurement model (outer model)

4.1.1. Convergent validity

To ensure the model's construct reliability and validity, the convergent validity was examined, and the results of all items' reliability were above 0.7, which meet the cut-off point recommended by Hair et al. (2017). In the same context, results of composite reliability (CR) for all the study variables were also above 0.7, and also meet the recommended cut-off point of Bryman and Cramer (2011) and Hair et al. (2017). In addition, the Average Variance Extracted (AVE) results for all variables exceeded 0.5, which recommended by Fornell and Larcker (1981). So the results show that the model is reliable and valid. See **Table 1**.

Table 1. Results of measurement model-convergent validity.

Construct	Item	Loading	α	AVE	CR
Perceived Ease of Use (Pillai and Sivathanu, 2020)	GPT-PEU-1	0.948	0.941	0.674	0.888
	GPT-PEU-2	0.800			
	GPT-PEU-3	0.934			
	GPT-PEU-4	0.865			
Perceived Utility (Ashfaq et al., 2020)	GPT-PU-1	0.764	0.902	0.655	0.848
	GPT-PU-2	0.939			
	GPT-PU-3	0.706			
Service Quality (Ashfaq et al., 2020)	GPT-SQ-1	0.909	0.912	0.741	0.934
	GPT-SQ-2	0.731			
	GPT-SQ-3	0.913			
	GPT-SQ-4	0.865			
	GPT-SQ-5	0.871			
Perceived Trust (Pillai and Sivathanu, 2020)	GPT-PT-1	0.791	0.912	0.687	0.898
	GPT-PT-2	0.836			
	GPT-PT-3	0.890			
	GPT-PT-4	0.793			
Perceived Hedonic (Venkatesh et al., 2012)	GPT-PH-1	0.755	0.904	0.654	0.847
	GPT-PH-2	0.935			
	GPT-PH-3	0.719			
GPT Anthropomorphism (Melián-González et al., 2021)	GPT-AN-1	0.959	0.922	0.774	0.931
	GPT-AN-2	0.804			
	GPT-AN-3	0.958			
	GPT-AN-4	0.782			
Chat GPT Usage Intention (López et al., 2011; and Venkatesh et al., 2012)	GPT-UI-1	0.772	0.941	0.780	0.946
	GPT-UI-2	0.959			
	GPT-UI-3	0.768			
	GPT-UI-4	0.952			
	GPT-UI-5	0.944			
Tourist Satisfaction (Chung et al., 2018)	TS-1	0.799	0.912	0.709	0.936
	TS-2	0.890			
	TS-3	0.821			
	TS-4	0.889			
	TS-5	0.828			
	TS-6	0.820			
Traditional Tour Operator Services (Pillai and Sivathanu, 2020)	TTOS-1	0.960	0.923	0.618	0.846
	TTOS-2	0.766			
	TTOS-3	0.954			

4.1.2. Discriminant validity

In order to support the level of confidence in the results and conclusions of the model, it was verified that all variables of the model differ from each other, proving

the discriminant validity of the model (Kock, 2020). So the Fornell-Larcker criterion and cross-loadings approaches were utilized. See **Tables 2** and **3,** and **Figure 2**.

Table 2. Latent variables correlations (Fornell-Larcker criterion).

Construct	GPT-PEU	GPT-PU	GPT-SQ	GPT-PT	GPT-PH	GPT-AN	GPT-UI	TS	TTOS
GPT-PEU	**0.821**								
GPT-PU	0.701	**0.810**							
GPT-SQ	0.591	0.609	**0.861**						
GPT-PT	0.466	0.407	0.664	**0.829**					
GPT-PH	0.424	0.647	0.488	0.462	**0.809**				
GPT-AN	0.664	0.719	0.622	0.611	0.542	**0.880**			
GPT-UI	0.678	0.564	0.546	0.626	0.612	0.528	**0.883**		
TS	0.488	0.726	0.642	0.482	0.622	0.644	0.712	**0.842**	
TTOS	0.126	0.090	0.099	0.096	0.089	0.120	0.102	0.105	**0.786**

* The values in bold are the square root of AVE.

The results at **Table 2** show that each variable explain the variance of its items better than other variables that that build the model, which support the discriminant validity of the model, as recommended by Fornell & Larcker (1981) and Hair et al. (2017). Also results of data analysis show that the items loadings of each variable is greater than its loading on all other variables of the model, which support the discriminant validity of the model, as recommended by Chin (1998).

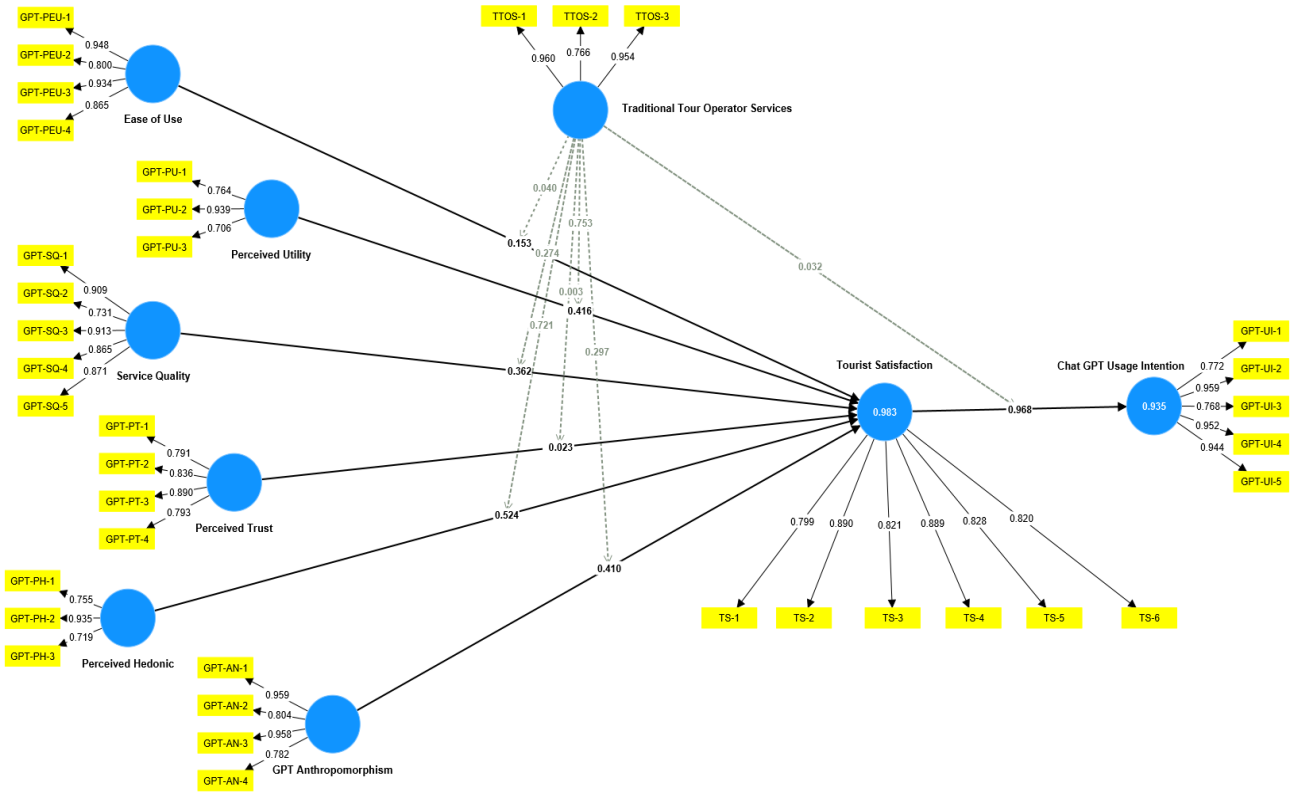

Figure 2. Measurement Model (Outer Model).

4.2. Structural Model (Inner Model)

4.2.1. Coefficient of determination (R^2)

In order to measure the ability of the model to predict the variance ratio occurring in the dependent variable by the independent variable, the coefficient of determination (R^2) was utilized. **Table 3** shows that the variance occurring by the independent variables "GPT-PEU"; "GPT-PU"; "GPT-SQ"; "GPT-PT"; "GPT-PH"; and "GPT-AN" on the dependent variable "TS", and the variance occurring by the independent variable "TS" on the dependent variable "GPT-UI" are high, and exceed the cut-off point which recommended by Chin (1998), as both results were over 0.67.

Table 3. R^2 of the endogenous latent variables.

Constructs	R-square	Results
Tourist Satisfaction "TS"	0.982	High
Chat GPT Usage Intention "GPT-UI"	0.935	High

4.2.2. Effect size (f^2)

In order to measure the individual impact of each exogenous latent variable on the endogenous latent variable, the assessment of effect size (f^2) was utilized. Results at **Table 4** show that the effects size of each variable of "GPT-PEU"; "GPT-PU"; "GPT-SQ"; "GPT-PT"; "GPT-PH"; and "GPT-AN" as exogenous latent variables of the model on "TS" as endogenous latent variable of the model, and the effect size of "TS" as an exogenous latent variable of the model on "GPT-UI" as an endogenous latent variable of the model. The results were varied between small, medium, and large, based on the recommendation of Cohen (1988).

Table 4. Assessment of effect size (f^2).

Constructs	TS	GPT-UI
GPT-PEU	0.224-Medium	-
GPT-PU	0.244-Medium	-
GPT-SQ	0.425-Large	-
GPT-PT	0.410-Large	-
GPT-PH	0.140-Small	-
GPT-AN	0.286-Medium	-
TS	-	0.927-Large

4.2.3. Goodness of fit of the model (GoF)

In order to ensure that the proposed model of this study is considered as a global fit measure model, at level of measurement, structural, and the overall performance of the model, goodness of fit of the model test was applied, according (Chin, 2010):

$$GoF = \sqrt{\mathrm{R^2 x\ AVE}}$$

$$GoF = 0.819$$

According to the criteria of Wetzels et al. (2009) and the result of GoF test, it can be concluded that the goodness of fit of the model of this study is large enough to be considered sufficiently valid for a global PLS model.

4.2.4. Hypotheses assessment (Significance of path coefficients)

In order to determine the extent of consistency between the proposed theoretical model and the collected data (primary data), the path coefficients significance test was conducted. All hypothesis testing results are summarized below. See **Table 5**.

Table 5. Hypotheses assessment.

Hypothesis (Paths)	Effect	Std. Beta	Std. Error	*T* Value	*P* values	Results
H1: Chat GPT Ease of Use → Tourists' Satisfaction	Direct	0.153	0.031	17.332	0.000	Supported
H2: Chat GPT Perceived Utility → Tourists' Satisfaction	Direct	0.415	0.042	4.558	0.000	Supported
H3: Chat GPT Service Quality → Tourists' Satisfaction	Direct	0.362	0.022	9.891	0.000	Supported
H4: Chat GPT Perceived Trust → Tourists' Satisfaction	Direct	0.023	0.012	16.337	0.000	Supported
H5: Chat GPT Perceived Hedonic → Tourists' Satisfaction	Direct	0.524	0.055	6.218	0.001	Supported
H6: Chat GPT Anthropomorphism → Tourists' Satisfaction	Direct	0.410	0.042	6.112	0.000	Supported
H7: Tourists' Satisfaction → Chat GPT Usage Intention	Direct	0.968	0.011	4.293	0.000	Supported
H8: Traditional Tour Operator Services x Chat GPT Ease of Use → Tourists' Satisfaction	Indirect	0.040	0.067	5.222	0.000	Supported
H9: Traditional Tour Operator Services x Chat GPT Perceived Utility → Tourists' Satisfaction	Indirect	0.753	0.048	9.881	0.000	Supported
H10: Traditional Tour Operator Services x Chat GPT Service Quality → Tourists' Satisfaction	Indirect	0.274	0.037	6.328	0.001	Supported
H11: Traditional Tour Operator Services x Chat GPT Perceived Trust → Tourists' Satisfaction	Indirect	0.003	0.038	4.234	0.000	Supported
H12: Traditional Tour Operator Services x Chat GPT Perceived Hedonic → Tourists' Satisfaction	Indirect	0.721	0.075	11.221	0.001	Supported
H13: Traditional Tour Operator Services x Chat GPT Anthropomorphism → Tourists' Satisfaction	Indirect	0.297	0.088	9.761	0.000	Supported
H14: Traditional Tour Operator Services x Tourists' Satisfaction → Chat GPT Usage Intention	Indirect	0.32	0.052	12.392	0.000	Supported

This study suggested 14 hypotheses (**Figure 1**), the structure equation model results (**Tables 4** and **5**). **Figure 3** showed that "GPT-PEU" has a positive and significant direct impact on "ST" (Effect size = 0.224, Std. Beta = 0.153, *P* = 0.000), "GPT-PU" has a positive and significant direct impact on "ST" (Effect size = 0.244, Std. Beta = 0.415, *P* = 0.000), "GPT-SQ" has a positive and significant direct impact on "ST" (Effect size = 0.425, Std. Beta = 0.362, *P* = 0.000), "GPT-PT" has a positive and significant direct impact on "ST" (Effect size = 0.410, Std. Beta = 0.023, *P* = 0.000), "GPT-PH" has a positive and significant direct impact on "ST" (Effect size = 0.140, Std. Beta = 0.524, *P* = 0.001), "GPT-AN" has a positive and significant direct impact on "ST" (Effect size = 0.286, Std. Beta = 0.410, *P* = 0.000), and "ST" has a positive and significant direct impact on "GPT-UI" (Effect size = 0.927, Std. Beta = 0.968, *P* = 0.000), so direct effects hypotheses H1, H2, H3, H4, H5, H6and H7 were supported. On the same context, "TTOS" moderates the relationship between "GPT-PEU" and "TS" (Moderation Effect size = 0.040, *P* = 0.000), "TTOS" moderates the relationship between "GPT-PU" and "TS" (Moderation Effect size= 0.753, *P* = 0.000), "TTOS" moderates the relationship between "GPT-SQ" and "TS" (Moderation Effect size= 0.274, *P* = 0.000), "TTOS" moderates the relationship between "GPT-PT" and

"TS" (Moderation Effect size = 0.003, *P* = 0.000), "TTOS" moderates the relationship between "GPT-PH" and "TS" (Moderation Effect size = 0.721, *P* = 0.001), "TTOS" moderates the relationship between "GPT-AN" and "TS" (Moderation Effect size = 0.297, *P* = 0.000), and "TTOS" moderates the relationship between "TS" and "GPT-UI" (Moderation Effect size = 0.32, *P* = 0.000), so hypotheses H8, H9, H10, H11, H12, H13, and H14 were supported, as all moderating relationships were significant and assist the intention.

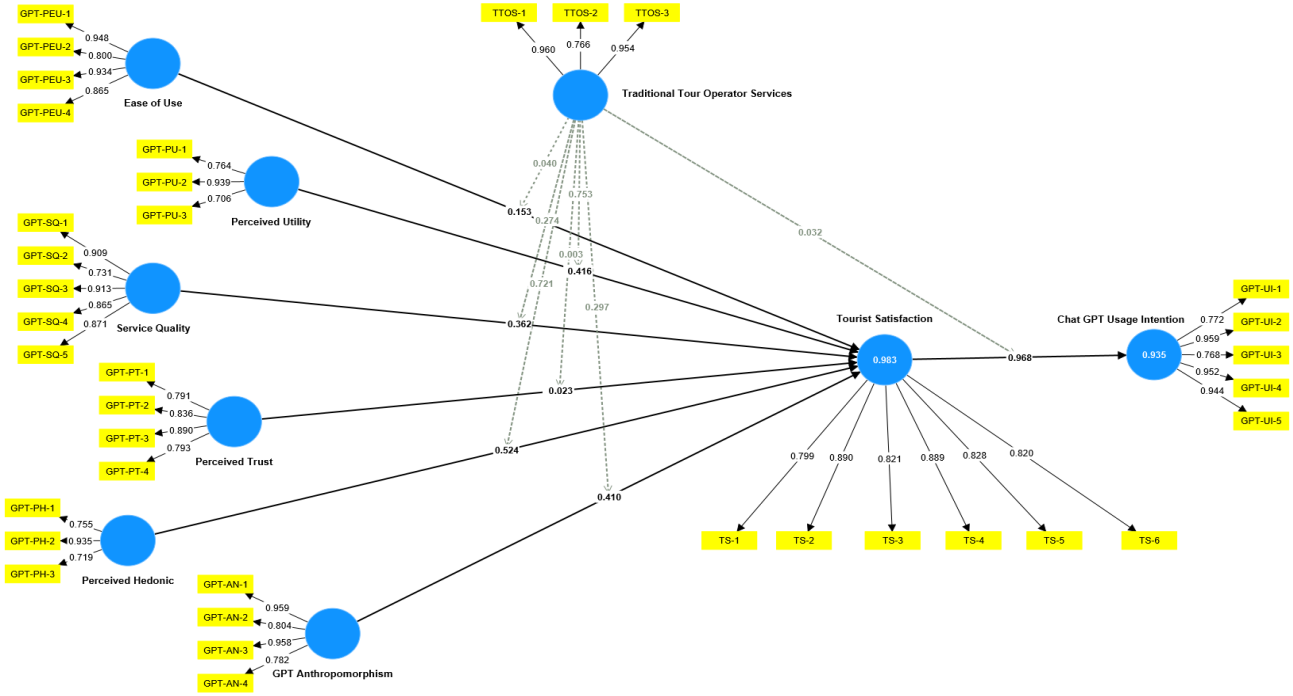

Figure 3. The proposed structural equation model.

5. Discussion and implications

This study was established to examine the interrelationship between among Chat GPT with its six dimensions (GPT Perceived Ease of Use; GPT Perceived Utility; GPT Service Quality; GPT Perceived Trust; GPT Perceived Hedonic; and GPT Anthropomorphism), tourist's satisfaction and chat GPT usage intention as perceived by tourist. In addition, to examine the moderating role of traditional tour operator services on the relationship between GPT's six dimensions and tourist's satisfaction, and between tourist's satisfaction and chat GPT usage intention. All interrelationships among all variables were examined.

According to the results, "GPT-PEU" positively and significantly influences "ST" as perceived by tourists. This is largely consistent with the findings of Menon and Shilpa (2023), who conducted semi-structured interviews with 32 Chat GPT users from India and demonstrated that one of the factors affecting user satisfaction in GPT chat is its ease of use. An additional Wong et al.'s (2023) study highlighted how ease of use affects visitors' happiness with GPT and offered an early look at Chat GPT's potential to improve the decision-making process for travelers before, during, and after their trip. Additionally, the findings demonstrated that "GPT-PU" positively and significantly influences "ST," which is comprised of Gursoy et al.'s study from 2023,

which offers a thorough analysis of the advantages of GPT as well as any potential risks or difficulties they may present to the hotel and tourism sector. The feasibility of integrating GPT into different travel stages and decision-making processes is also discussed. Also, "GPT-SQ" has a positive and significant direct impact on "ST", which is consistent with study of ÇOLAK (2023) which found that GPT technology can provide better customer interaction and decision-making, leading to a more personalized travel experience. Customers seem to appreciate these benefits, reflecting increased satisfaction. Another study by Kim et al. (2023) found that while there can be issues with inaccurate information, properly utilized AI technology like ChatGPT generally improves tourism decision-making, thereby enhancing visitor satisfaction. In addition, the results showed that "GPT-PT" has a positive and significant direct impact on "ST", which is largely consistent with what addressed by Kim et al. (2023) they found that trust towards personalized travel recommendations offered by Chat GPT significantly influences tourist satisfaction. According to a different study by Ali et al. (2023), Chat GPT can improve decision-making and overall tourism efficiency; nonetheless, preserving the authenticity of its information is essential for raising visitor satisfaction and confidence. Additionally, the results demonstrated that "GPT-PH" had a positive and significant direct impact on "ST," which is consistent with the findings of Cai et al. (2023), who discovered that in Chat GPT-assisted language learning, information system quality and hedonic motives play a more significant role in influencing average performance expectancy and perceived satisfaction than self-regulation in Chat GPT-assisted language learning. Also, "GPT-AN" has a positive and significant direct impact on "ST", which is consistent with Wang et al. (2023) which focused on the feature of anthropomorphism of Chat GPT and showed that it was significantly positively related to Chat GPT use, and this feature affects user satisfaction by Conducting a survey of 784 participants in China. Another study of Ali et al. (2023) found that on Chat GPT anthropomorphism, have shown that. In the context of tourism, anthropomorphism in Chat GPT improves travelers' experience by providing a more intuitive, conversational interface for obtaining information and making decisions. And "ST" has a positive and significant direct impact on "GPT-UI" as perceived by tourist, which is consistent with both of ÇOLAK (2023) and Kim et al. (2023) which proved that the satisfaction of tourists plays a significant role in their intention to use Chat GPT. Travelers are more likely to stick with Chat GPT for future travel-related questions and tasks when they have a positive experience interacting with the technology. Important elements that influence this pleasure are Chat GPT's ability to personalize the trip experience, its convenience of use, the effectiveness of its responses, and the caliber and applicability of the information it offers. But worries regarding authenticity and privacy could potentially lower user happiness and, as a result, decrease users' propensity to use Chat GPT. Furthermore, the results emphasis the moderating role of "TTOS" on the relationship between GPT's six dimensions (GPT Perceived Ease of Use; GPT Perceived Utility; GPT Service Quality; GPT Perceived Trust; GPT Perceived Hedonic; and GPT Anthropomorphism) and tourist's satisfaction, and on the relationship between tourist's satisfaction and chat GPT usage intention.

The study produced a number of findings that are significant and have an effect on the theoretical and practical applications of chat GPT in the tourism sector. It helped

to validate the gaps in the literature regarding the relationship between chat GPT usage and tourists' satisfaction as well as their intention to use it to plan and book vacations, respond to inquiries about travel more rapidly, and carry out a variety of travel-related tasks more easily. Additionally, it adds to the scant body of research on the moderating effect of conventional tour operator services on the relationship between the pleasure of tourists, their intention to use the service, and the chat GPT service. These findings yield valuable insights for both scholars and practitioners within tourism industry, particularly those guiding using information technology in tourism services and activities, on effective strategies to achieve optimal usage of technological applications through traditional tour operators.

6. Conclusion, limitations and future research

This study aims to investigate the relationship between tourists' satisfaction and their intention to use chat GPT, as well as the moderating effect of traditional tour operator services on the relationship between tourists' satisfaction and GPT's six dimensions (GPT Perceived Ease of Use, GPT Perceived Utility, GPT Service Quality, GPT Perceived Trust, GPT Perceived Hedonic, and GPT Anthropomorphism). Data were collected from 624 tourists. The statistical package SPSSvs24 and Excel Sheet 2010 were used to analyse the descriptive data and explore the demographic features of the respondents, additionally, the structural equation modeling (PLS-SEM V.4) was utilized to examine the direct and indirect impacts between variables and to test the research hypotheses. The SEM results showed that the six dimensions of chat GPT service ("GPT-PEU"; "GPT-PU"; "GPT-SQ"; "GPT-PT"; "GPT-PH"; and "GPT-AN") have a positive and significant direct impact on tourist's satisfaction, and tourist's satisfaction has a positive and significant direct impact on tourist's GPT usage intention. Moreover, the SEM results proved a moderating effect of traditional tour operator services on the relationship between GPT's six dimensions and tourist's satisfaction, and on the relationship between tourist's satisfaction and tourist's GPT usage intention, which may yield valuable insights for both scholars and practitioners within the tourism industry, particularly those guiding using information technology in tourism services and activities, on effective strategies to achieve optimal usage of technological applications through traditional tour operators.

Like many prior studies, the present research possesses certain constraints and limitations that pave the path for future investigation avenues. Subsequent studies could delve into demographic attributes like gender and age, either as moderators or through conducting multi-group analyses to discern variances in the scrutinized relationships. Moreover, further exploration could explore alternative potential mediators and moderators, contrasting their outcomes with our own. Furthermore, future research endeavours could re-evaluate the current model across diverse cultural contexts.

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project administration, THA. All authors have read and agreed to the published version of the manuscript.

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