Exploring the User Behaviour towards GST Adoption in India: Insights from PLS-SEM Analysis

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Abstract

GST, or "Goods and Services Tax", is a comprehensive indirect tax levied on the supply of goods GST, a pivotal facet of India's taxation system, represents a transformative approach to streamlining tax processes and nurturing economic prosperity through its comprehensive imposition on goods and services. This study delves into the intricate realm of user behavior surrounding GST adoption, employing "Partial Least Squares Structural Equation Modeling (PLS-SEM)" to unravel the complex interplay among various factors. By meticulously scrutinizing 135 valid responses out of 200 collected through a rigorous survey methodology, this research ensures robustness in its findings. Notably, the study underscores the reliability and validity of its measurement model, with all constructs within the established thresholds, thus laying a solid foundation for subsequent analysis. Structural model analysis reveals significant relationships between perceived usefulness, ease of use, compatibility, observability, cost, user satisfaction, attitude, and user behavior regarding GST adoption. Specifically, perceived usefulness and ease of use positively impact attitude, while perceived compatibility, observability, and cost positively influence user satisfaction. Moreover, user satisfaction and attitude positively influence user behavior. These findings offer valuable insights into the factors influencing GST adoption and have implications for policymakers, practitioners, and researchers.

Keywords: GST, PLS-SEM, Adoption, TAM, Purposive sampling

1.   Introduction

The "Goods and Services Tax (GST)" stands as a significant fiscal reform, not only in India but also globally, aiming to streamline the taxation system and foster economic growth. Introduced in India on July 1, 2017, GST replaced a myriad of indirect taxes levied by the central and state governments, unifying the taxation structure under a single regime (Hoseini & Briand, 2020). This move towards a uniform tax framework was not unique to India; several countries around the world have adopted similar taxation reforms to enhance efficiency, transparency, and ease of doing business (Das, 2020). In essence, "GST is a value-added tax levied on the consumption of goods and services," characterized by its multi-stage and destination-based nature. It operates on the principle of taxing the value addition at each stage of the supply chain, ensuring that the tax burden is borne by the end consumer (Alavuotunki et al., 2019). This approach aims to eliminate the cascading effect of taxes, promote tax compliance, and mitigate tax evasion, ultimately contributing to a more robust and equitable tax system.

In the Indian context, the implementation of GST marks a significant milestone in the country's economic landscape, promising to revolutionize the taxation regime and spur economic growth. With its potential to simplify tax compliance, reduce tax cascading, and create a unified national market, GST holds immense relevance for businesses operating in India (Mehrotra, 2022). The introduction of GST in India has had far-reaching implications for businesses, consumers, and the economy as a whole. It has simplified the tax compliance process for businesses by replacing multiple taxes with a single

tax system. GST has also facilitated seamless movement of goods across state borders, leading to efficiency gains in logistics and supply chain management (Majumder et al., 2021). Moreover, GST has contributed to increased tax revenue for both the central and state governments, enabling them to invest in infrastructure development, social welfare programs, and other public services. However, the implementation of GST has also posed challenges, including initial teething problems, compliance issues, and adjustment difficulties for businesses (Greeff, 2019). Overall, GST in India represents a significant reform in the country's tax system, with the potential to drive economic growth, enhance competitiveness, and foster a more transparent and efficient business environment. As GST continues to evolve and mature, it is expected to play a crucial role in India's journey towards economic development and prosperity.

However, the successful adoption and effective utilization of GST by businesses hinge on various factors, including perceived usefulness, perceived ease of use, perceived compatibility, perceived observability, and perceived cost. This research aims to delve into the usage behavior of businesses regarding GST adoption, employing the "Technology Acceptance Model (TAM)" framework with some other literature-based variable. By investigating the role of "TAM model, perceived compatibility, observability, and cost" as determinants of GST adoption behavior, this study seeks to provide valuable insights into the factors influencing user behaviour within the GST regime. Through an empirical analysis, the research endeavours to contribute to a deeper understanding of GST adoption dynamics, thereby informing policymakers, tax authorities, and businesses alike in their efforts to navigate the evolving taxation landscape.

2. Literature Review

Prior studies have laid the groundwork for understanding GST adoption behaviors. Table 1 depicts key literature to contextualize our research.

2.1 Goods and Services Tax (GST)

"Goods and Services Tax (GST) is a comprehensive indirect tax levied on the supply of goods and services". It is a destination-based tax system, which means that it is collected at the point of consumption rather than at the point of origin (Peng et al., 2021). "The GST regime in India was introduced on July 1, 2017, replacing multiple indirect taxes such as central excise duty, service tax, value-added tax (VAT), and others". The implementation of GST in India aimed to simplify the tax structure, eliminate cascading of taxes, promote ease of doing business, and create a unified national market. Under the GST regime, goods and services are classified into different tax slabs, "including 0%, 5%, 12%, 18%, and 28%," based on their nature and essentiality (Ojha & Vrat, 2019). Additionally, certain goods and services are exempted from GST or taxed at a reduced rate to ensure affordability and fairness. GST in India follows a dual model, with both the central government and state governments having the authority to levy and collect GST (Majumder et al., 2021). The central GST (CGST) is levied by the central government, while the state GST (SGST) is levied by the respective state governments. Integrated GST (IGST) is applicable on interstate transactions and is collected by the central government.

Table 1: Review of Literature on GST Adoption

Authors	Country/Region	Journal	Analysis Technique	Area of Research	Findings
Narayanan & Latiff (2024)	Malaysia	Asian Economic Papers	Descriptive Analysis	Business Economics	"The advantage of a properly designed GST as a stable, efficient, transparent, and effective revenue source cannot be ignored. Malaysia may have to return to the GST at some point in the future, but it is important to avoid viewing it as an immediate and permanent solution to rising government deficits and debt."

Neyter & Nivievskyi (2023)	Ukrainian	Agribusiness	Logistic Model and Farm Data	Agriculture	"It is found that both subsidy schemes have a similar effect on the exit decision and reduce the probability of leaving the market. However, this effect is contemporaneous only. The subsidy a farm receives in the current year does not affect next year's exit decision."
Chlond et al. (2023)	France	Environmental and Resource Economics	Inverse Probability Weighting	Environmental Economics	"It is found that funding from the schemes to reduce energy expenses most cost-effectively via the White Certificates. Redistribution is neutral for each of the four schemes: higher and lower income households equally benefit from them."
Mudiyanselage & Chen (2022)	127 Developing Countries	International Tax and Public Finance	Difference-in-Differences Strategy	Business Economics	"It is analysed that VAT increases the share of tax in GDP. However, the increase is mostly channelled through the increase in effective tax rate, while creating an extra tax burden on the existing firms and leading to shrinking tax base."
N. Guo et al. (2022)	Australia	Journal of Forecasting	Time Series Analysis	Business Economics	"The best medium-term point forecasts come from a trend model with stochastic volatility in the transitory component and that with a moving average component, while long-run point forecasts are better made by trend models with stochastic volatilities and a moving average component. In a full sample study, we also find that trend models can capture various dynamics in periods of significance to the Australian economy which conventional models cannot."
Aneja et al. (2021)	India	Journal of Empirical Legal Studies	Panel Data Estimation	Law	"The Study shows that adoption of a VAT system increased firm capital by around three percent. Effects are driven by the most financially-constrained firms – an important source of heterogeneity in a developing country context. Our findings thus suggest that beyond revenue generation, consumption tax reforms can have the additional effect of stimulating investment and productivity in resource-constrained environments."

Vafainia et al. (2021)	Netherlands	Marketing Letters	Descriptive Analysis	Business Economics	"The results show that VAT-free promotions positively impact store performance. Moreover, the findings indicate that more non-LP members are attracted to the store and that they increase the amount they spend in the store. While LP members also spend more in the store, this increase in shopping basket size does not compensate for the significant drop in the number of LP members that visit the store, leading to an overall decrease in sales coming from LP members during VAT-free days."
Hoseini & Briand (2020)	India	Economica	Regression Analysis	Business Economics	"The results show significant increase in the tax compliance of forwardly linked activities following the VAT adoption in 2003. The findings also suggest that the reduction in informality due to the VAT adoption is associated with higher productivity and growth of services in India."
Sun et al. (2020)	China	Energy Economics	Difference-in-Differences Strategy	Business Economics	"The results show that VAT refunds of new energy industry could decrease the return on equity (ROE) of the experiment group, which is lower than the control group by 4.7%. This is mainly due to the distorted industrial chain, overcapacity and insufficient innovation motivation caused by the tax incentives."
Alavuotunki et al. (2019)	China	Journal of Development Studies	Difference-in-Differences Strategy	Business Economics	"The results show that VAT refunds of new energy industry could decrease the return on equity (ROE) of the experiment group, which is lower than the control group by 4.7%. This is mainly due to the distorted industrial chain, overcapacity and insufficient innovation motivation caused by the tax incentives."

Source: Author's Creation

3. Hypothesis Development and Conceptual Model

3.1 Hypothesis Development

The study employed the "Technology Acceptance Model (TAM) developed by Davis, (1989)" and other important factors identified through a survey of relevant literature to investigate user behaviour in relation to the adoption of "goods and services tax (GST)". Figure 1 displays the study model that illustrates the interrelationship between the various factors.

3.1.1   Technology Acceptance Model (TAM)

"Perceived usefulness is defined as the degree to which an individual believes that using a particular technology would be beneficial" (Davis, 1989). As an individual's perceived usefulness of a given law increases, their intentions to adopt the law also increase. "Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). GST is going to make tax compliance simple and effective, resulting in a positive attitude among users. Previous studies depicted that PU and PEOU are significant antecedents of adoption (e.g., Al-Adwan *et al.*, 2023; Shen *et al.*, 2022). Thus, these hypotheses are formed.

H1: Perceived usefulness positively impacts attitude.

H2: Perceived ease of use positively impacts attitude.

3.1.2   Perceived Compatibility

Perceived compatibility refers to the extent to which a new technology aligns with existing practices, beliefs, and needs of users (Rogers, 1995). In the context of GST adoption, it signifies how well the tax system integrates with businesses' operational workflows and requirements. Studies by Akour et al. (2022) & Rogers (1995), and others have consistently demonstrated the significance of compatibility in driving adoption decisions. Hence, understanding and evaluating perceived compatibility are crucial aspects of studying the impact of GST adoption on user behavior.

H3: Perceived compatibility positively impacts user satisfaction.

3.1.3   Perceived Observability

Perceived observability means "how the technology can be described, seen, and imagined. It is considered a crucial factor in the adoption of law in the legal environment" (Bennett & Robinson, 2003) Several studies have examined and validated the notion that observability positively affects adoption (e.g., Akour et al., 2022; Almaiah et al., 2022; Rogers, 1995). Therefore, it is essential to consider the GST adoption and its impact on the user behaviour.

H4: Perceived observability positively impacts user satisfaction.

3.1.4   Perceived Cost

Perceived cost refers to the assessment of the financial expenses associated with adopting a new technology or system (Godoe & Johansen, 2012). Previous studies emphasize its influence on adoption decisions. Understanding perceived cost is crucial in evaluating the implications of GST adoption on user behavior.

H5: Perceived cost positively impacts user satisfaction.

3.1.5   Attitude, User Satisfaction, and User Behaviour

Attitudes are the focal point of psychology and related fields, and attitude modifications result in associated behavior changes (Howe & Krosnick, 2017). It refers to the "desire to use the system after its evaluation" (Akturan & Tezcan, 2012). It shows individuals' assessment of the behavior, whether positive or negative. The influence of different variables forms the attitude, influencing the user behaviour (Yang et al., 2022). A positive attitude results in the favourable user behaviour of individuals to adopt the system.

User satisfaction is a critical aspect influencing user behavior and system adoption. It highlights its significance in psychology, suggesting that satisfying experiences often lead to favourable attitudes and subsequent behavior changes. Defined as the "desire to use the system after its evaluation" (Akturan & Tezcan, 2012), user satisfaction reflects individuals' overall assessment of a system or service. Positive evaluations typically result in favourable attitudes towards the system. Consequently, satisfied users are more likely to exhibit favourable usage behavior, contributing to increased adoption rates and system success.

H6: Attitude positively impacts user behaviour.

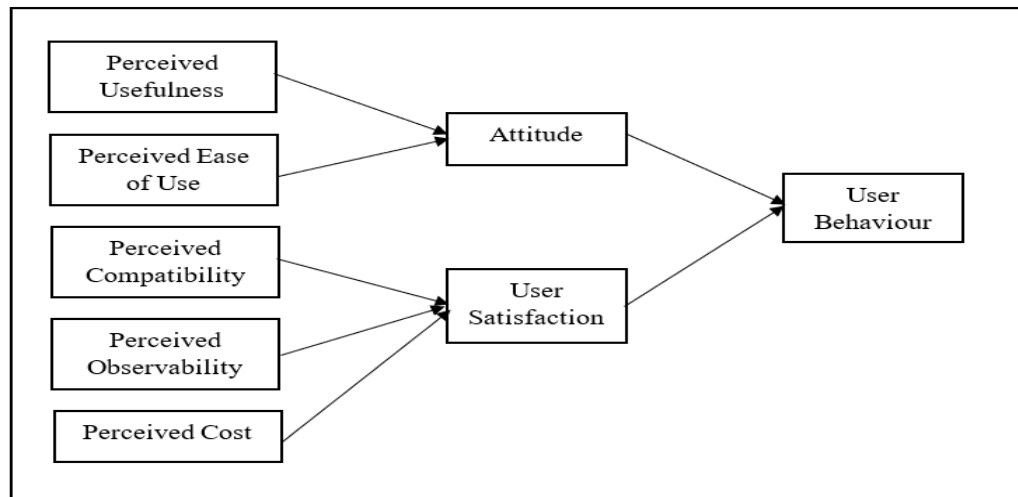H7: User satisfaction positively impacts user behaviour.

3.2 Conceptual Model

Figure 1: Conceptual Model (Author's creation)

4. Methodology

This study employed a quantitative methodology to thoroughly investigate users' behavior concerning GST adoption. Utilizing Smart PLS-4, a robust tool for analyzing complex relationships among multiple variables, the study employed "Partial Least Squares Structural Equation Modeling (PLS-SEM)" (Almarzouqi et al., 2022). A pilot survey was conducted to test the reliability and validity of the constructs, and after incorporating the suggested changes, the final survey was conducted to collect the data. A comprehensive survey was conducted using the "purposive sampling technique", involving the participation of 200 respondents. From this pool, 135 valid responses were meticulously selected for analysis, following stringent screening and quality control procedures. Respondents' responses were assessed using a five-point Likert scale. Through the application of PLS-SEM, the conceptual model underwent rigorous statistical testing, ensuring a reliable foundation for exploring the factors influencing user behavior in the context of GST adoption. The demographic profile of the respondents has been mentioned in the Table 2.

Table 2: Demographics

"Characteristics"	"Categories"	"No. of Respondents"	"Percentage (%)"
"Gender"	"Male"	109	80.74
	"Female"	26	19.26
"Age"	"15 – 24"	5	3.70
	"25 – 34"	6	4.44
	"35 – 44"	99	73.34
	"45 and above"	25	18.52
'Education"	"Diploma"	21	15.55
	"Bachelor's degree"	56	41.48
	"Master's degree"	26	19.26
	"Doctoral degree"	3	2.23
	"Other"	29	21.48
"Monthly Income"	"Less than 5 Lakh"	24	17.78
	"5 Lakh - 10 Lakh"	46	34.07
	"10 Lakh - 15Lakh"	21	15.55
	"15 Lakh - 20 Lakh"	27	20
	"20 Lakh and above"	17	12.60

Source: Authors' creation

5. Findings

The research findings acquired using "Partial Least Squares Structural Equation Modelling (PLS-SEM) in Smart PLS-4" demonstrated a strong measurement model that confirmed the reliability and accuracy of the variables. The structural model examines the connections between these variables and has yielded valuable insights into the factors that impact user behaviour. The study is free from "common method bias (CMB)" as all the VIF values lies between 1.39-2.06 which is less than the threshold value of 3.3 (Hair et al., 2019).

5.1 Measurement Model

The main focus of this work was to assess the reliability and validity of the latent constructs studying the measurement model in PLS-SEM. The AVE values exceeded the minimum criterion of 0.5, thereby proving the presence of convergent validity. After thoroughly analyzing the factor loadings, the study found that each result exceeded the required threshold of 0.7, indicating a high level of item reliability. Furthermore, the reliability coefficients, namely rho-a, and rho-c, are above the acceptable threshold of 0.7, ensuring a robust level of internal consistency (Fornell & Larcker, 1981). The study assessed the "Heterotrait-Monotrait Ratio (HTMT)" values to determine whether there was evidence of discriminant validity. The results confirmed the uniqueness of the underlying components, strengthening the measurement model's overall reliability (Hair et al., 2019). The results of this study confirm the measurement model's accuracy and dependability, providing a solid foundation for additional research into the structural model. The study presents Tables 3 and 4 to illustrate the findings.

Table 3: Construct Reliability and Validity

Constructs	Factor Loadings	CR (rho_a)	CR (rho_c)	AVE
"Perceived Usefulness (PU)"		0.849	0.895	0.681
PU1	0.838			
PU2	0.864			
PU3	0.813			
PU4	0.785			
"Perceived Ease of Use (PEOU)"		0.869	0.916	0.785
PEOU1	0.884			
PEOU2	0.892			
PEOU3	0.881			
"Perceived Compatibility (PCO)"		0.853	0.896	0.684
PC1	0.857			
PC2	0.831			
PC3	0.832			
PC4	0.786			
"Perceived Observability (PO)"		0.883	0.904	0.701
PO1	0.862			
PO2	0.881			
PO3	0.810			
PO4	0.793			
"Perceived Cost (PC)"		0.854	0.911	0.773
PC1	0.880			
PC2	0.877			
PC3	0.880			
"Attitude (AT)"		0.857	0.889	0.666
AT1	0.784			
AT2	0.881			
AT3	0.825			
AT4	0.771			

"User Satisfaction (US)"		0.856	0.900	0.693
US1	0.841			
US2	0.832			
US3	0.852			
US4	0.805			
"User Behaviour (UB)"		0.838	0.891	0.672
UB1	0.829			
UB2	0.870			
UB3	0.835			
UB4	0.741			

Source: Authors' creation

Table 4: Discriminant Validity (HTMT)

	AT	PO	PCO	UB	US	PC	PEOU	PU
AT								
PO	0.649							
PCO	0.539	0.629						
UB	0.761	0.725	0.595					
US	0.421	0.608	0.381	0.577				
PC	0.749	0.759	0.640	0.744	0.589			
PEOU	0.695	0.806	0.614	0.712	0.610	0.802		
PU	0.702	0.783	0.675	0.750	0.599	0.829	0.736	

Source: Authors' creation

5.2 Structural Model

An extensive investigation was conducted using PLS-SEM structural model analysis to evaluate the robustness and importance of the relationships among the factors. All values surpassed the suggested threshold, indicating the presence of significant relationships (Hair et al., 2019). The p-values and t-statistics corresponding to the path coefficients were used to assess the statistical significance of the hypothesized pathways, shown in Table 5. The predictive relevance of the model was assessed using Q^2 values, which indicate its capacity to foresee endogenous latent components. Using f2 values, which provided a measure of the linkages' practical significance, the magnitude of the impacts was evaluated. The R^2 values assessed explanatory power of the model as total variance explained (Hair et al., 2019), which is 44.4% in attitude, 49% in user satisfaction, and 53.5% in user behaviour. Additionally, goodness of fit model was assessed by measuring the "standardized root mean square residual" SRMR, yielding a value of 0.043, which is below than the threshold limit of 0.08 (Hair et al., 2017). The study framework's links were highlighted for their robustness and significance by examining these attributes in the structural model. All hypotheses have been confirmed and the results of structural model has been displayed in Table 5.

Table 5: Structural Model Results

Hypothesis	Beta (b)	*T* statistics	*p* values	f²	R²	Q²	Supported
H1: PU >AT	0.359	2.961	0.003	0.137	0.444	0.426	Yes
H2: PEOU >AT	0.378	3.938	0.000	0.152			Yes
H3:PCO >US	0.260	3.815	0.000	0.093	0.490	0.508	Yes
H4: PO >US	0.523	6.495	0.000	0.374			Yes
H5: PC >US	0.261	2.853	0.004	0.074			Yes
H6: AT >UB	0.413	4.138	0.000	0.216	0.535	0.466	Yes
H7: US >UB	0.207	2.542	0.011	0.069			Yes

Source: Authors' creation

6. Discussion and Conclusion

The findings from the structural model analysis reveal significant relationships between the variables, shedding light on the determinants of user behavior regarding GST adoption. Moving on to the relationship between perceived usefulness (PU) and attitude (AT), Hypothesis 1 (H1) posited a positive association between these variables. The results support this hypothesis, with a beta coefficient of 0.359, a significant T statistic of 2.961, and a substantial effect size (f2) of 0.137. This indicates that businesses perceive GST as useful in achieving their objectives, leading to a favourable attitude toward GST adoption (Wang & Anwar, 2022). Similarly, Hypothesis 2 (H2) proposed a positive relationship between perceived ease of use (PEOU) and attitude (AT). The analysis confirms this hypothesis, with a beta coefficient of 0.378, a significant T statistic of 3.938, and a notable effect size (f2) of 0.152. This suggests that businesses perceive GST as easy to use, which positively influences their attitude toward GST adoption.

Hypothesis 3 (H3) posited that perceived compatibility (PCO) positively influences user satisfaction (US), and the results support this hypothesis, with a beta coefficient of 0.260 and a significant T statistic of 3.815. This suggests that businesses perceive GST as compatible with their existing operations, leading to higher levels of satisfaction with the GST regime (Carattini et al., 2017). Similarly, Hypothesis 4 (H4) proposed a positive relationship between perceived observability (PO) and user satisfaction (US). The results indicate strong support for this hypothesis, with a beta coefficient of 0.523 and a significant T statistic of 6.495. This implies that businesses value the visibility of GST-related processes and outcomes, contributing to overall satisfaction with the GST implementation (Qi et al., 2023). Hypothesis 5 (H5) suggested that perceived cost (PC) positively influences user satisfaction (US). The analysis reveals a significant relationship between these variables, with a beta coefficient of 0.261 and a significant T statistic of 2.853. This suggests that businesses perceive the costs associated with GST compliance as manageable, leading to higher levels of satisfaction with the GST regime.

Moreover, Hypotheses 6 (H6) and 7 (H7) examined the relationships between attitude (AT) and user behavior (UB), and between user satisfaction (US) and user behavior (UB) respectively. Both hypotheses received empirical support, indicating that higher levels of user satisfaction and a favourable attitude toward GST adoption led to more favourable user behavior regarding GST compliance and utilization (Chlond et al., 2023). Overall, the findings from the structural model analysis provide valuable insights into the factors influencing user behavior regarding GST adoption. These findings have significant implications for policymakers, practitioners, and researchers seeking to enhance GST adoption and compliance among businesses.

7. Implications

The implications of this research are multifaceted and hold significance for various stakeholders involved in GST implementation and compliance. Firstly, the findings underscore the importance of perceived usefulness, ease of use, compatibility, observability, cost, satisfaction, and attitude in influencing user behavior regarding GST adoption. Policymakers can use these insights to design more effective GST implementation strategies and policies that address businesses' concerns and enhance their satisfaction with the GST regime. Additionally, practitioners and businesses can leverage these findings to tailor their GST compliance processes and systems to better meet users' needs and preferences, thereby improving overall compliance rates and operational efficiency. Furthermore, researchers can build upon this study's framework and methodology to conduct further investigations into the determinants of GST adoption and explore additional factors that may influence businesses' behavior in this context. Overall, the findings of this research contribute valuable insights to the ongoing discourse on GST adoption and compliance, with implications for policy, practice, and future research endeavours.

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