The adoption of Virtual Reality in small to medium tourism enterprises: An application of the Theory of Planned Behaviour

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ABSTRACT

Virtual reality (VR) is increasingly transforming tourism experiences and destination engagement. However, existing research has predominantly examined its adoption through the Technology Acceptance Model, leaving the explanatory potential of the Theory of Planned Behavior (TPB) comparatively underexplored. This study examines the applicability of TPB in explaining tourists' behavioral intentions and actual behavior toward VR adoption in tourism. Using a quantitative survey design, data were collected from 280 tourists through online and offline questionnaires using convenience sampling. The hypothesized relationships were assessed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The findings demonstrate that attitude, subjective norms, and perceived behavioral control significantly influence behavioral intention and actual behavior. Furthermore, behavioral intention significantly mediates the relationship between perceived behavioral control and actual behavior. However, behavioral intention does not significantly mediate the relationships between attitude and actual behavior or between subjective norms and actual behavior. These findings extend the application of TPB to tourism technology adoption by demonstrating that tourists' evaluations, social influences, and perceived control are relevant to VR-related behavioral outcomes, although their effects operate through different mechanisms. The study also provides practical implications for small and medium-sized tourism enterprises, particularly in developing-country contexts, by emphasizing the importance of fostering favorable attitudes, leveraging relevant social influences, and reducing resource and accessibility barriers to encourage VR adoption. Overall, the findings reinforce the relevance of TPB as a complementary theoretical framework for understanding emerging technology adoption in tourism beyond conventional technology acceptance perspectives.

Keywords: *Virtual Reality; Theory of Planned Behaviour; Attitude; Subjective Norms; Perceived Behavioural Control; Behaviour*

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INTRODUCTION

Digital marketing is becoming more common in leisure tourism and hospitality, especially with the rise of Industry 4.0. Virtual Reality (VR) is one such technology, offering new ways to market tourism and improve customer satisfaction (World Travel and Tourism Council (WTTC), 2023). VR services help travellers make better decisions by replacing traditional marketing channels, such as billboards and brochures, with digital trust and real-time information (Gupta & Bhaskar, 2023). Small to medium-sized tourism businesses can use VR to provide immersive and personalised experiences that larger companies may find hard to match. Because tourism is intangible and varied, VR is especially useful for these businesses to boost customer satisfaction (Gil-Cordero et al., 2024).

Calisto and Sarkar (2024) describe virtual reality (VR) as an interactive technology that brings the enjoyable parts of tourism to life using real-world content. VR lets tourists experience destinations from home. In Zimbabwe, small to medium-sized tourism businesses are using VR to keep up with changing consumer trends. Buhalis et al. (2023) observed that before the 2000s, people mostly bought traditional travel packages. Still, new technology has since changed what travellers want, giving them more choices and information (Kozak & Correia, 2025). SMEs that use VR to create engaging and realistic marketing can more effectively attract and retain travellers, including those from China (Zhu et al., 2024). Digital innovation, such as VR, helps promote tourism by encouraging more people to travel.

Small to medium-sized tourism enterprises face tough competition and rapid technological change. Pessot et al. (2025) suggest that these businesses are leading digital marketing by using innovative VR to gain a lasting advantage with customised services. For instance, VR helps customers before, during, and after their purchase by offering realistic and attractive virtual experiences (Rahim et al., 2021). This support helps travellers make quick and confident decisions (Amuso et al., 2021). In this way, VR increases the value of services and enhances the benefits of digital marketing (Vrontis et al., 2022).

Paliwal et al. (2024) examined the factors influencing Indian travellers' use of VR tourism. They found that smart VR tourism aligns with the sustainable values of Indian tourists, thanks to the increased use of digital platforms by tourism providers, including SMEs. Tourists now use VR marketing and get real-time information about destinations. As a result, interest in heritage and cultural tours has grown because travellers can access reliable information directly from suppliers, making digital marketing even more important (Zheng et al., 2023).

In the tourism business, customer experience is a critical success factor. For example, restaurants incorporate 3D culinary experiences and menu cards to encourage patrons to purchase food and beverages. According to Marshall (2022), in a cruise-line study, VR depictions of food are replaced after purchase with real, signature gourmet meals prepared by a professional chef. In addition, VR can market the entire tourist attraction. This powerful marketing tool enables organisations to leverage VR to engage customers, boosting their market share in the tourism sector (Liu et al., 2023).

Calisto and Sarkar (2024) note that VR is now used in hospitality, travel, and leisure marketing to help people learn and encourage them to visit attractions. For example, Zimbabwe used virtual tours at its EXPO 2020 Pavilion in Dubai to boost its visibility (Chirisa et al., 2020). The Rainbow Towers Group also promotes its hotels and amenities with virtual tours on its website (RTG, 2023). As consumer behaviour changes, marketing strategies must keep up. Hoang et al. (2024) suggest that VR platforms allow

people to experience destinations remotely and inspire them to travel. Njerekai (2020) found that 360-degree virtual tours at the Great Zimbabwe Monuments attract visitors who might otherwise be limited by distance, time, money, or physical challenges, increasing their intention to visit.

Pessot et al. (2025) point out that little research has examined how SMEs adopt VR, despite its great potential. As a result, VR use in tourism is still new, and more work is needed to understand how SMEs can fully implement it (Sousa et al., 2024; Loureiro et al., 2020). In Zimbabwe, Njerekai (2020) examined a tour package at the Great Zimbabwe Monument, and Chirisa et al. (2020) supported the use of virtual platforms for tourism marketing. This study addresses the lack of research on VR adoption in small to medium-sized tourism enterprises and explains why VR is becoming increasingly important in tourism marketing.

The research aims to deepen our understanding of the factors driving virtual reality adoption, drawing on the theory of planned behaviour. The results of the study will be useful for managers in SMEs to make informed decisions on the determinant factors to adopt virtual reality. This also enables them to provide interactive and customised experiences in the virtual context.

LITERATURE REVIEW, RESEARCH FRAMEWORK, AND HYPOTHESES

The Theory of Planned Behaviour

Research on technology adoption has traversed disciplines (Kieanwatana & Vongvit, 2024). Subsequently, researchers have developed and applied numerous theories and models to explain the factors that determine the acceptance and use of new technologies (Sternad & Bobek, 2013). Among such models and theories are the Technology Acceptance Model, the stimulus-organism-response model, the diffusion theory, the theory of reasoned action and the theory of planned behaviour. Although most theories and models have been applied across different socio-economic contexts, this study applies Ajzen's (1991) TPB. The theory has been successfully applied to expound on users' technology adoption behaviour (Lu et al., 2022). The TPB has been validated as a powerful theory across the various domains of human behaviour (Cui & Bell, 2022).

The TPB's validity in explaining human behaviour has been supported over the years (Zaremohzzabieh et al., 2019), and it has been applied to explain customers' technology adoption behaviour (Lu et al., 2022). The TPB has merits that set it apart from alternative models for predicting and changing behaviour (Ajzen, 2020), particularly in its consideration of social factors.

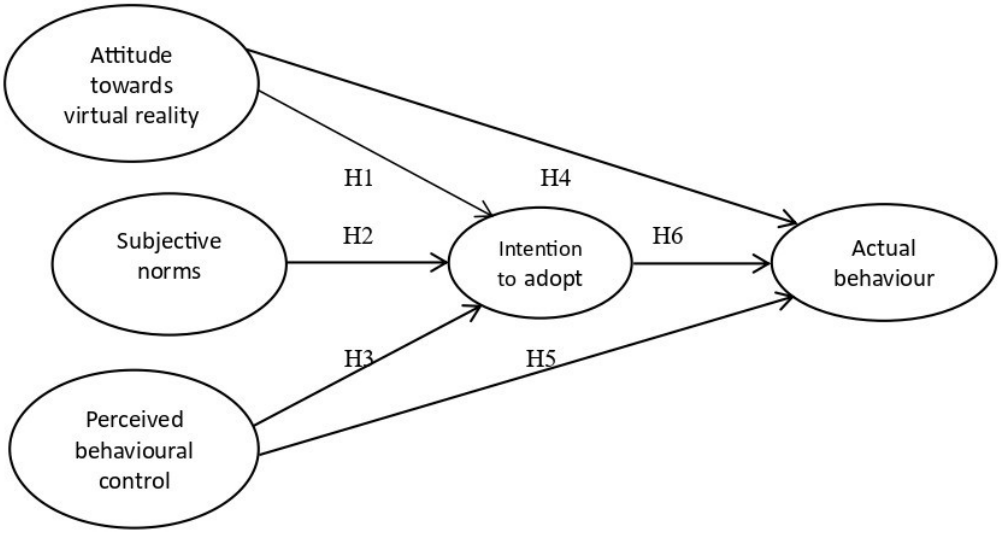
In this study, the theory of planned behaviour (TPB) is utilised to provide a theoretical understanding of the factors influencing virtual reality adoption in small to medium-sized tourism enterprises, with specific reference to the Tourism and Hospitality Industry in Zimbabwe, a developing African country. Additionally, there is scant research on VR adoption in SMEs, particularly in a developing country like Zimbabwe. In fact, within this context, the extant literature provides no evidence on the applicability of the TPB to SMEs; thus, this study examines the relative significance of the TPB constructs in determining intention to adopt and actual behaviour.

The TPB assumes that attitudes, subjective norms and perceived behavioural control primarily predetermine an individual's intention to behave. Ajzen (1991) noted that attitude towards behaviour depends on the extent to which an individual evaluates the behaviour in question. Thus, when the individual deems the behaviour favourable, the propensity to act is higher, and vice versa. Regarding subjective norms, an individual may be subjected to social pressure that either encourages or discourages the behaviour.

Ultimately, perceived behavioural control entails the extent to which behaviour is perceived as easy or difficult to perform. Thus, in the current study, the three determinants (attitude, social norms, and perceived behavioural control) explain the variance in the behaviour to adopt virtual reality.

Theoretical Framework and Hypotheses Development

The theoretical framework is a construct composed of the TPB's key elements. The framework assumes that attitudes towards virtual reality, subjective norms, and perceived behavioural control determine the adoption of virtual reality among hospitality and tourism visitors. Similarly, intention to adopt is assumed to mediate the associations among attitude, subjective norms, perceived behavioural control, and actual behaviour. Thus, this study examines how the TPB facilitates the adoption of virtual reality. Figure 1 depicts the theoretical framework of this study.



Source: Developed by the authors of this study, 2026

Figure 1
Theoretical Framework

Attitude Towards Virtual Reality and Intention to Adopt

An attitude toward behaviour refers "to the extent to which an individual has a favourable or unfavourable evaluation or appraisal of the behaviour in question" (Beck & Ajzen, 1991). Depending on the evaluation's favourability, an individual acts of their own volition. According to Ajzen (1991), an individual's attitude can predict the intention to behave in a particular manner; thus, in this study, we suggest that attitude towards virtual reality may influence its adoption. In a previous study, Yeo et al. (2017) examined the relationship between consumer attitudes toward online services and found a positive association. In another study, Lutz (1985) found that attitudes towards virtual reality predict behavioural intentions. Thus, the following hypothesis is traced:

H1: Attitude towards virtual reality is positively correlated with intention to adopt in small to medium tourism enterprises.

Subjective Norms and Intention to Adopt

An individual's commitment to behave depends on the support, endorsement, and perceptions of significant potential reference groups, such as family members, work colleagues, and friends. These groups affect one's choices (Ajzen, 1991). Thus, an individual's subjective norms can predict an individual's intention to behave in a given way. Seong and Hong (2023) studied the decision-making process leading to participation in VR sports, and their results revealed that subjective norms do not explain individuals' intention to participate. The influence of subjective norms on the formation of intention has been confirmed by previous researchers (Sann et al., 2024; Singh et al., 2024). Their studies indicated that subjective norms are significant predictors of behavioural intention. Thus, the following hypothesis is proposed:

H2: Subjective norms are positively correlated with the intention to adopt in small to medium tourism enterprises.

Perceived Behavioural Control and Intention to Adopt

Ajzen (1991) defined perceived behavioural control as an individual's perception of how easy or difficult it is to perform the behaviour. This means the performance of an intended behaviour depends on the individual's self-control and capacity. According to Fishbein and Ajzen (2010), the TPB has been used to understand consumers' purchase intentions for products and services. Aitken et al. (2020) examined the effect of perceived behavioural control on behavioural intentions and found a significant positive effect. In another study that examined the effect of perceived behavioural control on the intention to adopt electric vehicles in India, the results indicated a positive relationship between the two constructs (Shalender & Sharma, 2021). Thus, the following hypothesis is proposed:

H3: Perceived behavioural control is positively correlated with the intention to adopt in small to medium tourism enterprises.

Attitude Towards Virtual Reality and Actual Behaviour

Attitude has been conceptualised as an individual's positive or negative attitude towards an attitude object (Lee et al., 2017). Whenever an individual has experience with an attitude object, knowledge of the brand's value increases, leading to a positive attitude. Studies on the attitude-behaviour relationship have been conducted across disciplines, yielding conflicting results, yet attitude largely determines behaviour. Studies by Ozturkean (2021) and Wang et al. (2019) found that attitude strongly influences consumer behaviour. Huang and Liaw (2018) noted that one determinant of system acceptance is an individual's attitude toward using such a system. Liu et al. (2023) examined the effect of virtual tourism on behavioural intention, and the results supported a significant positive relationship. As such, in this study, we assume that individuals with a positive attitude towards virtual reality are likely to adopt it. In fact, several previous studies have confirmed that attitude influences behaviour (Vishwakarma et al., 2020; Saleem et al., 2022). Thus, the following hypothesis is proposed:

H4: Attitude towards virtual reality is positively correlated with actual behaviour in small to medium tourism enterprises.

Perceived Behavioural Control and Behaviour

One of the most important constructs in the TPB is perceived behavioural control. The construct is conceptualised as the individual's perception of the difficulty and ease of performing behaviour (Ajzen, 1991). Perceived behavioural control assumes that

accessible control beliefs determine behaviour; that is, if there is a belief that there exist hindering factors to perform the behaviour, then the lower the propensity to engage in the behaviour in question. Empirical studies have substantiated that perceived behavioural control is an immediate antecedent of behaviour. For example, Yitbarek and Zeleke (2013) found that perceived behavioural control positively affects the adoption of various applications and technologies. In the hospitality and tourism industry, studies have also found that perceived behavioural control significantly affects tourists' behaviour (Hwang et al., 2020; Liu et al., 2023). This study assumes that perceived behavioural control will positively affect the adoption of virtual reality applications in SMEs. Thus, the following hypothesis is proposed:

H5: Perceived behavioural control is positively correlated with actual behaviour in small to medium tourism enterprises.

Intention to Adopt and Behaviour

The Theory of Planned Behaviour highlighted the determinant role of behavioural intentions in predicting future behaviour (Ajzen & Fishbein, 1980). In sum, intention is considered a focal construct that summarises an individual's motivation to perform a given behaviour and the effort they are prepared to expend to pursue it. Prior research in hospitality and tourism has examined the correlation between behavioural intention and actual behaviour among travellers and found that behavioural intention is an immediate precursor of behaviour (Ryu et al., 2023). Thus, in this study, we regard intention to engage in behaviour as a critical factor in determining behaviour. Fishbein and Ajzen (1975) echoed the same sentiments. Thus, whenever individuals have strong intentions to engage in a given behaviour, they are likely to act accordingly. Empirical research by several authors has indicated that behavioural intentions play a significant role in shaping actual behaviour (Kim et al., 2015; Shi et al., 2021; Zheng et al., 2019). Thus, the following hypothesis is proposed:

H6: Intention to adopt is positively correlated with actual behaviour in small to medium tourism enterprises.

The mediating relationship among Attitude Towards Virtual Reality, Subjective Norms, Perceived Behavioural Control and Behaviour.

According to the TPB, behavioural intention connects an individual's attitude to certain behaviours (Ajzen, 1991). This implies that the correlation between attitude and behaviour may be expressed either directly or indirectly. Although previous studies have proliferated, few have explored the mediating effect of behavioural intention (Bhatti et al., 2014). In a previous study, Mafabi et al. (2017) examined the mediating role of behavioural intention in the relationships among attitude, subjective norms, and perceived behavioural control, and found that behavioural intention indeed mediated these relationships. Several authors have reported that behavioural intention partially or fully mediated the relationships among various constructs (Ifedayo et al., 2021; Mafabi et al., 2017). There is a paucity of studies examining the mediating role of behavioural intention to adopt VR in small to medium-sized tourism enterprises. Thus, this study examines tourists' intention to adopt VR in small to medium-sized enterprises in the Tourism and Hospitality Industry. Thus, the following hypotheses are proposed:

H7: Intention to adopt mediates the relationship between attitude and actual behaviour in small to medium tourism enterprises.

H8: Intention to adopt mediates the relationship between subjective norms and actual behaviour in small to medium tourism enterprises.

H9: Intention to adopt mediates the relationship between perceived behavioural control and behaviour in small to medium tourism enterprises.

METHOD

A quantitative approach was used in this study because data were collected and analysed numerically, and hypotheses were tested to establish cause-and-effect relationships. The researchers employed a survey to collect data for the study. Data were collected from small to medium-sized tourism enterprises that used virtual reality to market their products and services during and after the COVID-19 pandemic. In the data collection process, only local tourists were included in the study population, as the researchers deemed them to have the necessary data to answer the research question. Specifically, during data collection, we included participants who were aware of VR applications and had used them. The questionnaire included a screening questionnaire to ensure that only eligible participants were selected. Though we initially intended to include foreign tourists, we excluded them to gain a clear picture of how local tourists were using VR applications and the extent to which local people accepted the new technology.

Data were collected between April and June 2025 using both offline and online methods, including physical visits, emails, and WhatsApp. Due to challenges in reaching relevant participants, a convenience sampling approach was adopted, a non-probability sampling method in which participants are selected based on the researcher's judgement (Malhotra, 2020). Participants were selected for accessibility: only those available during visits were included, and emails were sent only to individuals with contact information. Budgetary constraints limited the number of visits to selected organisations.

A target sample of 350 participants was established, with questionnaires distributed as follows: 100 in person, 150 via WhatsApp, and 100 online. A total of 301 questionnaires were returned, of which 21 were discarded due to incomplete responses. Consequently, all data analyses in this study were based on 280 completed questionnaires.

The study consisted of five constructs: namely, attitude towards virtual reality, subjective norms towards virtual reality, perceived behavioural control towards virtual reality, intention to adopt virtual reality and actual behaviour towards virtual reality. All the research items were adapted from extant literature (see Table 1).

All variables were operationalised using a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The questionnaire comprised three main sections. A pilot study was conducted to check if the items were comprehensible to the participants. The pilot study confirmed that the questionnaire was suitable for use in a fully-fledged survey.

Table 1
Measurement Items for the Constructs

Construct	Code	Item statements	Sources
Attitude towards virtual reality	ATT1	I like the idea of using virtual reality.	Ajzen (1991); Ajzen and Fishbein (1980)
	ATT2	I prefer virtual reality to other technologies.	
	ATT3	I agree with the continued use of virtual reality.	
	ATT4	I find virtual reality technology attractive.	
Subjective norms	SN1	Most people around me think I should use virtual reality.	

	SN2	People whose opinions I value prefer that I use virtual reality.	Ajzen (1991); Han et al. (2017)
	SN3	Most people who matter to me want me to use virtual reality.	
	SN4	My family members support my using virtual reality.	
Perceived behavioural control	PBC1	I can easily use virtual reality when needed.	Ajzen (1991); Shih & Fang (2004)
	PBC2	I have the resources to use virtual reality.	
	PBC3	I have the knowledge to use virtual reality.	
	PBC4	It is easy for me to use virtual reality.	
Intention to adopt	ITA1	I intend to use virtual reality when travelling	Kum et al. (2019); Venkatesh et al. (2012)
	ITA2	I plan to use virtual reality when travelling.	
	ITA3	I would recommend virtual reality to my friends and family.	
	ITA4	I intend to use virtual reality in the future.	
Actual behaviour	AB1	I frequently use virtual reality because it is user-friendly.	Hsu and Huang (2012); Verbeke & Vackier (2005)
	AB2	I use virtual reality to check the suitability of facilities.	
	AB3	I spend a lot of time on virtual reality.	
	AB4	I often use virtual reality when booking accommodation.	

RESULTS AND DISCUSSION

Descriptive Statistics

Of the respondents, 52.9% were female, and 45% were male. Only 2.1% preferred not to say their gender. The most dominant age group was 35-44 (36%), and the least dominant was 55 years and older (7%). The most predominant group was that earning US$551-650 per month (see Table 2).

Table 2
Demographic traits of participants (N = 280)

Variable	Frequency	Percentage
Gender		
Female	148	52.9
Male	126	45
Prefer not to say	6	2.1
Age		
18-25	42	15
26-34	83	30
35-44	100	36
45-54	35	12
55 and older	20	7
Average income per month		
Less than US$250	5	2
US$251-350	33	12
US$351-450	45	16
US$451-550	52	19
US$551-650	77	27
US$651 and above	68	24

Source: Data analyzed, 2026

Measurement Model

The researchers employed SMART PLS 4.0 to analyse the measurement model. The initial phase entailed analysing the measurement model to assess its reliability, validity, and dimensions (Hair et al., 2014). All factors loaded above the suggested value of 0.4 (Pallant,

2011) (see Table 3); accordingly, the measurement model was evaluated without modification. The results revealed that the reliability indices for all variables exceeded the suggested minimum threshold of 0.7 (Cronbach, 1951). Convergent validity was assessed using the average variance extracted and composite reliability, and all values were above the minimum thresholds of 0.5 and 0.70, respectively (Fornell & Larcker, 1981; Hulland, 1999) (see Table 3).

Table 3
Factor Loadings, Construct Reliability and Validity

Construct	Items	Loadings	Cronbach's alpha	CR (rho-a)	CR (rho-c)	AVE
Actual behaviour	AB1	0.831	0.870	0.872	0.911	0.719
	AB2	0.875				
	AB3	0.850				
	AB3	0.835				
Attitude	ATT1	0.828	0.854	0.859	0.902	0.697
	ATT2	0.824				
	ATT3	0.900				
	ATT4	0.784				
Intention to adopt	ITA1	0.875	0.868	0.881	0.911	0.721
	ITA2	0.896				
	ITA3	0.902				
	ITA4	0.707				
Perceived behavioural control	PBC1	0.799	0.823	0.848	0.882	0.651
	PBC2	0.757				
	PBC3	0.867				
	PBC4	0.801				
Subjective norms	SN1	0.598	0.821	0.876	0.883	0.660
	SN2	0.806				
	SN3	0.913				
	SN4	0.894				

Source: Data analyzed, 2026

Discriminant validity

Discriminant validity was evaluated following Fornell and Larcker (1981), who recommended that correlations among constructs must exceed the square root of each construct's average variance extracted. As recommended, the model demonstrated discriminant validity, as depicted in Table 4.

Table 4
Discriminant validity

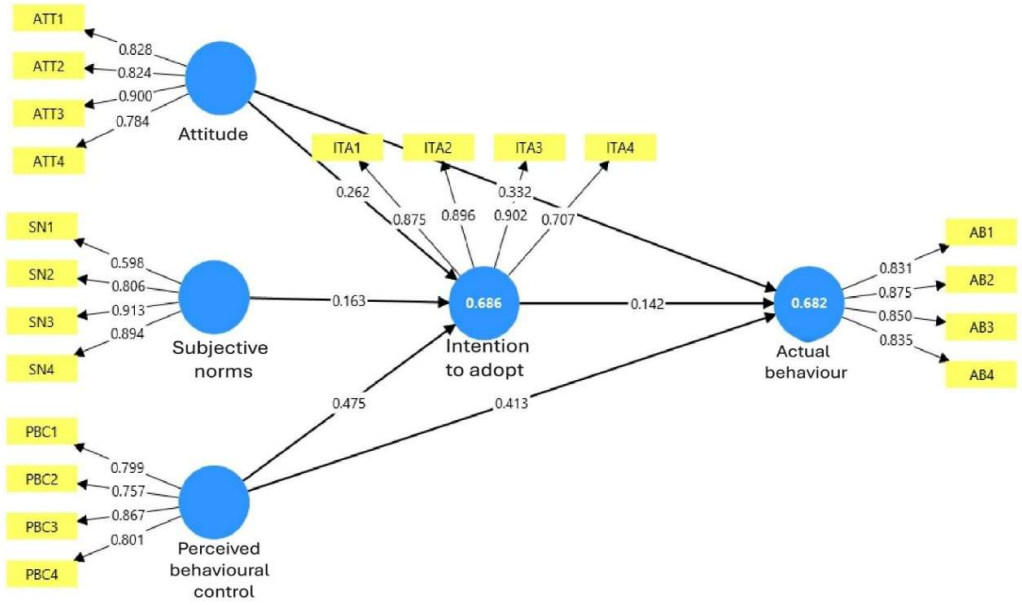
	Actual Behaviour	Attitude	Intention to adopt	Perceived behavioural Control	Subjective norms
Actual behaviour	**0.848**				
Attitude	0.765	**0.835**			
Intention to adopt	0.720	0.748	**0.849**		
Perceived behavioural control	0.789	0.791	0.798	**0.807**	
Subjective norms	0.665	0.676	0.676	0.707	**0.812**

Source: Data analyzed, 2026

Structural Model

Model fit summary

The structural model was tested to assess if it fitted the data; the results showed that SRMR was 0.082, d-ULS was 1.398, d-G was 1.918, chi-square was 542.01, and NFI was 0.91 (Byrne, 1994). The results also indicate R^2 values of 0.686 and 0.682 for intention to adopt and actual behaviour, respectively. This shows that the model's predictive power was supported by R^2 values exceeding 0.10 (Falk & Miller, 1992). Thus, the model fitted the data (see Figure 2).



Source: Data analyzed, 2026

Figure 2
Results of PLS-SEM

Hypotheses Testing

After confirming the model's fit to the data, the researchers used a bias-corrected accelerated bootstrap to analyse 5000 subsamples. The outcome showed that all the proposed hypotheses were supported. Specifically, attitude towards virtual reality had a significant positive relationship with intention to adopt (H1: β = 0,262; t =3.619 ; p < 0.05), subjective norms had a significant positive relationship with intention to adopt (H2: β = 0.162; t = 2.783; p < 0.05; perceived behavioural control had a significant positive relationship with intention to adopt (H3: β = 0.475; t = 7.432; p < 0.05); attitude had a significant positive relationship with actual behaviour (H4: β = 0.332; t = 5.437; p < 0.05); perceived behavioural control had a significant positive relationship with actual behaviour (H5: β = 0.413; t = 6.912; p < 0.05) and intention to adopt had a positive relationship with actual behaviour (H6: β = 0.142; t = 2.424; p < 0.05).

Mediation effect

In addition to the direct relationships, a mediation analysis was performed; the bootstrap results supported only one of the proposed indirect influences and did not support the other two. Specifically, intention to adopt mediated the relationship between attitude and behaviour (H7: β = 0.07; t = 2.464; p < 0.05); intention to adopt did not mediate the

relationship between subjective norms and actual behaviour (H8: β = 0.02: t =1.189; p > 0.05); and intention to adopt did not mediate the relationship between perceived behavioural control and actual behaviour (H9: β = 0.04; t =1.235; p > 0.05). The results for both the direct and indirect relationships are depicted in Table 5.

Table 5
Results of the structural model

Relationships	βeta	T-statistics	P-value	Results
ATT -> ITA	0.262	3.619	0.000	H1: Supported
SN -> ITA	0.162	2.783	0.000	H2: Supported
PBC -> ITA	0.475	7.432	0.001	H3: Supported
ATT -> AB	0.332	5.437	0.000	H4: Supported
PBC -> AB	0.413	6.912	0.003	H5: Supported
ITA-> AB	0.142	2.424	0.000	H6: Supported
PBC1 -> ITA -> AB	0.068	2.464	0.000	H7: Supported
SN -> ITA -> AB	0.023	1.189	0.117	H8: Not supported
ATT -> ITA -> AB	0.037	1.235	0.105	H9: Not supported

Source: Data analyzed, 2026

Discussion

This study examined how small to medium tourism enterprises adopted virtual reality through the lens of the theory of planned behaviour. In specific terms, researchers assessed how attitude, subjective norms, and perceived behavioural control predicted intention to adopt a behaviour. In addition, the study also examined the mediating effect of intention to adopt on the relationships among attitude, subjective norms and perceived behavioural control. In fact, over the years, studies have substantiated the positive influence of attitude on behaviour (Beck & Ajzen, 1991; Han et al., 2010; Yeo et al., 2017). The results of this study have confirmed the validity of previous studies, as they found that intention to adopt had a significant positive effect on actual behaviour (β = 0,262; t = 3.619; p < 0.05), supporting hypothesis *H1*. The strong positive relationship between intention and actual behaviour reinforces the notion that intentions are decisive predictors of behaviour, even in the adoption of VR by small to medium-sized tourism enterprises.

In prior studies, subjective norms have been investigated, and results have established a significant positive influence on the intention to adopt (Hong, 2023; Sann et al., 2024; Singh et al., 2024). Correspondingly, this study's results show that subjective norms have a significant positive effect on the intention to adopt (β = 0.162; t = 2.783; p < 0.05). Thus, hypothesis H2 is accepted. The findings of this study showed that people's intentions to adopt or use virtual reality were considerably influenced by their family members, friends, neighbours, important people, colleagues, and peer groups. All these people play an important role in raising awareness of adopting VR by educating people about its importance. Therefore, SMES must engage these people as they use VR technologies.

Aitken et al. (2020) and Shalender and Sharma (2020) opined that perceived behavioural control correlates positively with intention to adopt. Thus, this assertion aligns with the study's findings, which indicate a significant positive relationship between the two constructs (β = 0.475; t = 7.432; p < 0.05). Thus, hypothesis H3 is accepted. This means that if individuals have control over their resources and perceive the activity as easy to engage in, they are likely to adopt virtual reality. This research finding suggests that when tourists feel they can use virtual reality, they are more likely to adopt it. Thus,

SME owners can leverage perceived behavioural control to enhance the adoption and use of virtual reality.

Several authors have argued that attitude has a significant positive effect on behaviour (Huang & Liaw, 2018; Liu et al., 2023; Wang et al., 2019; Vishwakarma et al., 2020). The results of this study have also indicated that attitude has a significant positive relationship with behaviour (β = 0.332; t = 5.437; p < 0.05). Thus, hypothesis H4 is supported. This implies that whenever individuals have a positive attitude towards the behaviour in question, they are likely to engage in it. One possible reason for the significant relationship is that, despite Zimbabwe's status as a developing country, most tourists were already exposed to virtual reality.

According to Yitbarek and Zeleke (2013), Hwang et al. (2020) and Liu et al. (2020), perceived behavioural control has a significant positive relationship with behaviour. The study also found similar results (β = 0.413; t = 6.912; p < 0.05). Thus, hypothesis H5 is supported. This indicates that when the behaviour is easy for the individual, the likelihood of engaging in it increases. In addition, the results underscore the positive role of PBC in influencing VR use behaviour, with tourists more likely to engage when social norms are supportive.

Researchers across domains have established a significant positive relationship between intention to adopt and behaviour (Kim et al., 2015; Shi et al., 2021; Zheng et al., 2019). These results are also consistent with this study's findings; a significant positive relationship is confirmed (β = 0.142; t = 2.424; p < 0.05). Thus, hypothesis H6 is supported. Thus, when an individual has higher intentions to adopt, the likelihood of engaging in actual behaviour is higher. Thus, the research findings emphasise the need for practitioners to effectively leverage behavioural intention to market VR tourism, design compatible marketing strategies, and engage tourists.

Based on previous studies, results on the mediating role of intention among attitude, subjective norms, and perceived behavioural control have indicated a significant positive relationship (Mafabi et al., 2017; Ifedayo et al., 2021). This is consistent with the findings of this study. Intention to adopt mediated the relationship between attitude and actual behaviour (β = 0.07; t = 2.464; p < 0.05), supporting hypothesis H7, intention to adopt did not mediate the relationship between subjective norms and actual behaviour (β = 0.02: t =1.189; p < 0.05), hence hypothesis H8 is not supported and intention to adopt did not mediate the relationship between perceived behavioural control and actual behaviour (β = 0.04; t =1.235; p < 0.05), thus hypothesis H9 is not supported as shown by the weak mediation effect.

This is an interesting outcome that contrasts with most TPB research; the possible reason is that the informal nature of small to medium-sized tourism enterprises in emerging economies may also explain the weak mediation effect. Informal businesses often lack formal strategic planning processes, making behaviour less dependent on articulated intentions. This suggests that behaviour is not always the outcome of deliberate planning. Instead, behaviour may be shaped directly by contextual realities, institutional pressures, survival imperatives, and socio-cultural influences that characterise emerging economy tourism sectors.

Theoretical Implications

Grounded in the theory of planned behaviour, this study offers a comprehensive examination of the predictive validity of attitudes, subjective norms, and perceived behavioural control on intention to adopt and behaviour regarding the use of virtual reality applications. The study contributes to the extant literature by showing that the

use of virtual reality applications in the small to medium-sized tourism sector remains relatively new in developing countries and that adoption remains limited, despite the substantial benefits it offers the sector (Buhalis et al., 2023).

Specifically, this study extends the TPB by validating its core propositions in small to medium-sized tourism enterprises in a developing-country context. The findings demonstrate TPB's robustness under resource-constrained conditions and highlight the continued importance of attitudinal, normative, and control-related factors in shaping adoption intentions in Zimbabwe.

Most TPB studies stop at intention. This study went further by testing actual behaviour in small- to medium-sized tourism enterprises in Zimbabwe. The findings extended TPB research from intention-based explanations to actual behavioural outcomes. Much of the earlier TPB-based research on technology adoption focused mainly on behavioural intention rather than real usage behaviour. By showing that intention leads to actual use among SMEs, the study helps bridge the intention–behaviour gap and provides stronger empirical support for the core TPB assumption that intention is the immediate antecedent of behaviour. Thus, the study extended TPB by empirically linking its antecedents directly to observed behaviour, rather than just to intention, in an under-researched context.

In terms of mediation results, contrary to the TPB's central proposition, intention did not mediate the relationship between attitude, subjective norms, and actual behaviour. This finding suggests that in small to medium-sized tourism enterprises in a developing-country context, behavioural actions may occur without a fully articulated intention stage. The results, therefore, point to a context-specific boundary condition for TPB, in which resource constraints and decision immediacy may compress or bypass the intention–behaviour pathway.

The findings provided empirical evidence that the mediating role of intention is not universal, challenging TPB's core causal chain. The results call into question the universality of intention as a mediating mechanism. At the same time, TPB is nuanced by showing that, in small to medium-sized tourism enterprises in a developing-country context, behavioural influence may be more direct, compressed, or context-driven than the classical model suggests. The finding sits in an interesting middle space: it is not a full confirmation nor a full rejection of the TPB, but rather a contextual challenge with theoretical nuance.

Finally, the results contribute to extant literature on technology adoption by supporting TPB as a robust theoretical framework that complements other models, such as the Technology Acceptance Model and the Diffusion of Innovation. Previous studies have increasingly integrated TPB with other frameworks to understand technology adoption processes better, and have substantiated TPB's continued theoretical relevance in explaining innovation adoption behaviour.

Managerial Implications

The results of this study offer valuable managerial implications for small to medium-sized tourism enterprise practitioners, such as business practitioners and hotel booking service providers, who proactively leverage VR technologies.

First, managers and policymakers should focus on strengthening positive attitudes toward VR. Since attitude significantly affects the intention to adopt, tourism enterprise owners are more likely to adopt when they clearly understand the benefits of adoption. Managers should therefore emphasise the economic, operational, and competitive advantages of adoption, such as improved customer satisfaction, increased

efficiency, enhanced marketing reach, reduced costs, and greater business sustainability. Awareness campaigns, workshops, demonstrations, and success stories from other tourism enterprises can help cultivate favourable perceptions and encourage stronger intentions to adopt.

Second, the significant influence of subjective norms indicates that social influence and stakeholder pressure are key factors in shaping intentions to adopt VR. This means that tourism managers are influenced by industry peers, customers, government agencies, tourism associations, employees, and local communities. Managers should therefore leverage social networks and institutional support systems to encourage VR adoption behaviour. Small to medium-sized tourism boards and government agencies can create collaborative platforms where successful adopters share experiences and best practices. Public endorsements can also strengthen social approval and encourage other enterprises to adopt similar practices.

Third, the positive influence of perceived behavioural control suggests that SMEs are prepared to adopt virtual reality as long as they believe they possess the necessary resources, skills, knowledge, and capabilities to implement the innovation successfully. This highlights the importance of reducing operational and financial barriers to adoption. Business practitioners and policymakers should invest in capacity-building initiatives, including training programs, technical support, and digital literacy development.

Overall, the findings suggest that increasing adoption intentions among SMEs in Zimbabwe requires coordinated managerial and policy interventions that strengthen positive perceptions of the benefits of adoption, leverage social and institutional influence, and enhance enterprises' capacity and confidence to implement innovations successfully.

CONCLUSION AND SUGGESTION

The study examined the role of the Theory of Planned Behaviour in influencing the adoption of virtual reality applications. It assessed the mediating role of intention to adopt in the associations among attitude, subjective norms, perceived behavioural control, and behaviour. The study found that three factors affect both intentions to adopt and actual behaviour, and that these factors mediate the relationships among the constructs.

Despite the significant contributions to theory and practice, this study has many limitations. First, this study is limited to SMEs in urban and peri-urban areas, yet other regions may exhibit variation in attitudes, subjective norms, and perceived behavioural control. Therefore, it is encouraged to undertake research in other regions to compare results. Second, the researchers employed a cross-sectional design to collect data. This approach has challenges, including its inability to capture long-term changes; accordingly, a longitudinal design is recommended for future studies. Thus, longitudinal studies are encouraged. Third, a quantitative approach to examining predictive validity may be incomplete; accordingly, researchers should conduct qualitative studies to gain an in-depth understanding of virtual reality adoption. Fourth, the study's results are not generalisable, as they apply only to the area under investigation; other parts of the world exhibit cross-cultural differences. Lastly, the use of convenience sampling limits representativeness and increases the risk of selection bias, thereby affecting the reliability and generalisability of the results to a broader population.

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