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The impact of smart tourism applications in destinations on destination brand equity and competitiveness: The case of Istanbul

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Abstract: This study attempts to reveal whether smart tourism practices in the destination of Istanbul have an impression on destination brand equity (DBE) and destination competitiveness (DC). The sample group of the study consisted of domestic tourists visiting Istanbul. The data were obtained through a questionnaire. Primarily the data were evaluated for validity and reliability, and then correlation and regression analyses were applied. The findings showed that smart tourism practices in Istanbul did in fact make an impression on the brand equity and competitiveness of destinations. The study offers suggestions for the dissemination of smart tourism applications, which are seen as an effective factor in the branding process and competitiveness of Istanbul. A review of the literature indicated that the impression of smart tourism applications on the branding process and competitiveness of the destination had been analyzed in this study for the first time. Therefore, it can be said that the study is original.

Keywords: Smart tourism destinations (STDs), destination brand equity (DBE), destination competitiveness (DC), Istanbul.

1 Introduction

Living conditions of local people and visitors in tourist destinations can be improved through information and communication technologies (ICTs). Hence, it is imperative to establish interactive smart systems in

destinations that provide immediate access to the services and information requested by users, while also connecting local organisations through information technologies (Liberato et al., 2018). Although developments in smart tourism are not yet at the expected level, smart tourism implementations will gain more momentum in the coming years with the more widespread use of 5G communications technology, which enables fast data transfer and ubiquitous connectivity (Ye et al., 2020). There is a strong need in the literature for empirical research on smart tourism applications that will accelerate and guide these developments, as well as their possible contributions to the destination. There is also a need for studies evaluating the effect of smart tourism applications on the branding and competitiveness of destinations. Thus, by deciding whether smart tourism brings success to destinations — and what factors do or don't bring success — short, medium and long-term plans for smart tourism can be made, and road maps can be drawn.

Some studies draw attention to the correlation between smart tourism practices and destination branding and destination competitiveness (DC). Researchers have predicted that smart tourism applications can be effective in increasing the competitiveness of destinations (Boes et al., 2016; Cavaleiro et al., 2021). However, according to Boes et al. (2016), transformation into smart tourist destinations (STDs) requires leadership, vision, patience, adoption of a strategic management approach, continuous analysis of the current situation and adaptation to change. According to Jeong and Shin (2020), destinations aim to make the tourism experiment flourish and increase their competitiveness by incorporating information technologies into STDs. Liberato et al. (2018) recommend that for destinations to maintain their competitive position, they provide quality holiday experiences to their visitors and maximise the use of smart technologies that augment tourist satisfaction. Huertas et al. (2021) state that if destinations emphasize their smart aspects in the branding process, it will contribute to their success.

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Lestari et al. (2022) stress that the conversion of cities into smart tourist cities is becoming increasingly important for competitive branding. According to Basbeth et al. (2018), in the branding process, the destination should craft a smart image of itself, with the smart aspects of the destination linked to the assets and capabilities of the city as a resource. Gretzel and Mendonça (2019) emphasise that destinations should be branded as smart tourism destinations to amend their competitive position.

This study analysed the opinions of local tourists to investigate the impact of smart tourism applications in Istanbul on destination brand equity (DBE) and DC, while also investigating the effect of DBE on DC. No existing scientific field research was found in the literature that evaluated the impression of smart tourism applications on the branding and competitiveness of Istanbul and other destinations. This study seeks to be a response to this need in the literature.

2 Literature review

2.1 Smart tourism destinations (STDs)

The notion of “smart” has appeared as a conclusion of social, economic and technological improvements supported by a new generation of technologies that enable

sensors, open and big data, new ways of connecting and exchanging information — e.g., Internet of Things (IoT), RFID, and NFC — as well as improved judgement and reasoning (Gretzel et al., 2015b). The phenomenon of smart tourism is fundamentally focused on the composition of a network that allows for connections between information technologies and physical objects. Hence, the application of sensors and the Internet of Things (IoT) is the main target for smart tourism projects. The integration of information and physical infrastructure should thus be ensured for the realisation of the smart tourism project. Sensor technology is also very important for smart tourism. Other indispensable smart tourism technologies include accessible Wi-Fi services, near field communication (NFC), smartphones/mobile connectivity, radio frequency identification (RFID) and advanced databases and data-mining algorithms (Gretzel et al., 2015a).

Smart tourism is a management philosophy that aims to create a dynamic tourism system with broader impacts that include improving governance in tourism and achieving strategic goals (Gretzel, 2018). Smart tourism impacts a broad environment, and all tourism stakeholders, local communities, and future generations need to be included in the management process (Pan et al., 2021). Tourism destination managers are expected to lead other stakeholders in promoting destination smartness, implementing it and realising the changes necessary for its success (Boes et al., 2016). On the other end, STDs should effectively use big

Table 1: Dimensions and sub-dimensions of smart tourism

Dimensions	Sub-dimensions
Sustainability	Urban planning
	Urban mobility
	City-wide electricity supply
	Attention to garbage collection across the city
	Protection of public structures
Accessibility (for tourists with disabilities)	Accessibility
	Public transport
	Accessibility to tourist attractions
	Information services
	Electronic appliances/facilities
Technology	Access to Wi-Fi services throughout the city
	Access to high-speed internet throughout the city
	Travel apps providing information to tourists
	Websites providing information to tourists
	Social media accounts providing information to tourists
Innovation	Adaptation of local tourism organisations to innovation
	Innovative projects to improve touristic goods and services
	Adaptation of tourism enterprises to innovative technologies, such as QR codes, NFC, and RFID
	Promotion of touristic goods and services
	Distinctiveness of tourism services compared to other tourist destinations

Source: Filho et al. (2022).

data — which arises out of information exchange among stakeholders — to enhance tourists' tourism experience and provide them with personalised services (Buhalis & Amaranggana, 2015).

Tourism consumers' expectations and perceptions of STDs can be categorized into the following: information and communication technologies (ICTs); digital accessibility; smart mobility; smart tourism experiences; third-party influence (other travellers); infrastructure; sustainability; travel opportunities for people with disabilities; security; independence; technological dependence; emotional and physical comfort; and personal transformation (Corrêa & Gosling, 2021). Filho et al. (2022) divide the smart tourism dimensions (accessibility, sustainability, technology and innovation) into sub-dimensions determined by Segittur (2018), as shown in Table 1.

Filho et al.'s (2022) study, which transformed the main and sub-dimensions of smart tourism into a measurement tool, revealed that tourists' perceptions of STDs are most affected by the dimensions of innovation and sustainability. In our research, Filho et al.'s smart tourism dimensions were used theoretically.

2.2 Destination brand equity (DBE)

Destination brand equity (DBE) is the aggregation of significant elements that constitute the source of the competitive advantages that being a brand brings to a destination (Ferns & Walls, 2012). The DBE scale created by Boo et al. (2009) has five dimensions (brand awareness, perceived brand quality, brand equity, brand image and brand loyalty). The theoretical structure of destination brand awareness (DBA), as composed by Boo et al., (2009) is taken into account in the present study.

It is beneficial to briefly clarify the scope of DBE. Destination brand awareness (DBA) can be defined as the knowledge and recognition of a destination by potential tourists (Tran et al., 2019). Destination brand image (DBI), on the other hand, is an attitudinal structure consisting of a tourist's mental representation of their emotional, cognitive, and general impressions of a destination (Baloğlu & McCleary, 1999).

The perceived quality of a destination emerges as a consequence of tourists' comprehensive evaluations of their experiences with it. It can be said that brand quality is a significant aspect of consumer behaviour (Konecnick & Gartner, 2007). Destination brand loyalty (DBL) manifests here in revisiting or repurchasing a destination. DBL is divided into two categories: behavioural and atti-

tudinal loyalty. In behavioural loyalty, consumers make purchases based on traditions and habits, while in attitudinal loyalty, consumers repeat the purchase action depending on the benefit they get from the product (Gartner & Ruzzier, 2011). Destination brand value (DBV), on the other hand, can be described as the belief that a destination, perceived as a commercial good, is worth visiting and has comparative advantages that differentiate it from others (Choi, 2016).

2.3 Destination competitiveness (DC)

Destination competitiveness (DC) is dependent on their talent for maintaining their position in the market and offering high-economic-value goods and services that make the best use of their resources (Yoon, 2002). In short, destinations that have a high level of attractiveness and promise visitors a high-quality tourism experience have greater competitiveness (Dwyer & Kim, 2003).

DC is a long-term concept because the impact of tourism supply and demand on DC and the impact of DC on people's welfare can be monitored over time. The living standards of citizens, for example, can be expected to improve as a result of DC (Kozak et al., 2009). Moreover, DC can be characterised as a performance-based process (since its social and economic impacts can be measured) and as a perceptual period (since it is a consequence of tourists' experiences with a destination) (Novais et al., 2018).

Some studies (Altınay & Kozak, 2021; Dwyer & Kim, 2003), especially the study by Ritchie and Crouch (2003), propose different models in relation to DC or competitiveness in tourism. The model offered by Ritchie and Crouch (2003) is by far the most discussed in the literature. In this model, DC is based on the notions of comparative advantage (which refers to a destination's resource endowment), and competitive advantage (which refers to its ability to make use of its resources) (cited in Crouch, 2007).

According to Meng (2006), comparative advantage for destinations refers to their resources, such as landscape, climate and vegetation. Competitive advantage, on the other hand, consists of tourism infrastructure, festivals and events, management quality, labour skills, and government policies, etc. In short, comparative advantage can be defined as the destination's existing resources, while competitive advantage can be considered as the destination's ability to effectively exploit those resources.

3 Methodology

3.1 Hypothesis and research model

For the aim of the study, the independent variable is the STDs and their sub-dimensions (accessibility, technology and innovation); the dependent variables are the DBE variable and its sub-dimensions (destination brand awareness [DBA], destination brand quality and value [DBQV], destination brand image [DBI], destination brand loyalty [DBL]), as well as the destination competitiveness (DC) variable. The effect of DBE (the independent variable) on DC (the dependent variable) was also evaluated in this study. Figure 1 shows the research model.

The research hypotheses are as follows:

H₁: Smart tourism practices in Istanbul have a significant and positive effect on DC. (H_{1a}: the effect of AC on DC; H_{1b}: the effect of TI on DC.)

H₂: Smart tourism practices in Istanbul have a significant and positive effect on DBE. (H_{2a}: the effect of AC on DBA; H_{2b}: the effect of AC on DBI; H_{2c}: the effect of AC on DBQV; H_{2d}: the effect of AC on DBL; H_{2e}: the effect of TI on DBA; H_{2f}: the effect of TI on DBI; H_{2g}: the effect of TI on DBQV; H_{2h}: the effect of TI on DBL.)

H₃: The brand equity of the destination Istanbul has a significant and positive effect on DC. (H_{3a}: the effect of DBA on DC; H_{3b}: the effect of DBI on DC; H_{3c}: the effect of DBQV on DC; H_{3d}: the effect of DBL on DC.)

3.2 Population and sample

Domestic tourists visiting Istanbul are the subjects of the research. It is not possible to reach the entire population in the study; sample group was thus selected from the population. In the process of determining the sample, the convenience sampling method was utilised. The convenience sampling method is based on the principle of including people who have the characteristics determined by the researcher and can be reached quickly in the sample (Yükselen, 2003).

In this study, the sample selection was made by taking similar principles into consideration. Since there is no statistical data regarding the total number of domestic tourists constituting the population of the research, the size of the sample could not be calculated. In such cases, Karasar (2018) emphasizes that a sample size of around 300-400 is sufficient for statistical analysis in the social sciences, but that this number should not be less than 100. A total of 336 surveys were obtained for this study, which is adequate within the framework of Karasar's opinion. The main feature of the participants is that they are local tourists who have visited Istanbul before or who are visiting Istanbul.

3.3 Data collection

There are four sections of the questionnaire that is preferred as a data collection tool. The first section contains questions on gender, age, educational status, income status and average holiday expenditure. The second part includes the Smart Tourism Destinations (STDs) atti-

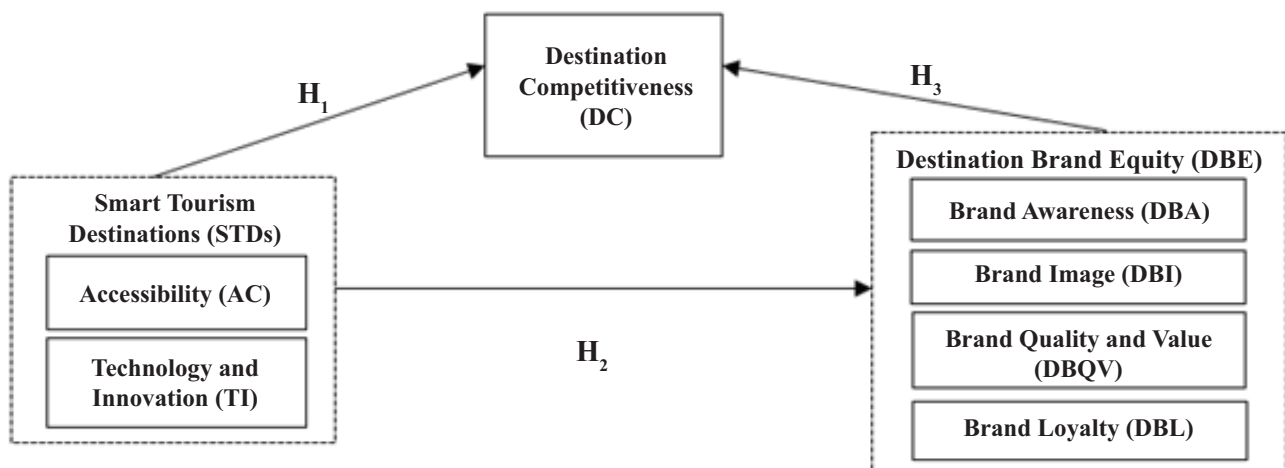


Figure 1: Research model

tude scale, as adapted from Filho et al. (2022). The third section contains the Destination Brand Equity (DBE) scale designed by Boo et al. (2009). In the fourth section of the questionnaire, the Destination Competitiveness (DC) attitude scale, improved by Khin et al. (2014), was used to determine the competitive position of Istanbul from the viewpoint of tourists. The answer options of the five-point Likert system utilised in the questionnaire were as follows: “Strongly disagree,” “Disagree,” “Neither agree nor disagree,” “Agree,” “Strongly agree.” The fieldwork was carried out through an electronic survey prepared through Google Forms. There were no incomplete or incorrectly filled questionnaires, and therefore, all 336 responses were included in the data analysis process.

3.4 Data analysis

The data related to the study were first subjected to validity, reliability and normality analyses to check whether they met the basic conditions for analysis. The construct validity of the scales and their sub-dimensions was reviewed using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The factor loadings of the items obtained by confirmatory factor analysis were analysed in terms of their convergent validity by calculating their Average Variance Extracted (AVE) and Composite Reliability (CR) values. The reliability of the data was evaluated by calculating Cronbach’s alpha (α) and Composite Reliability (CR) coefficients. The normal distribution of the data was determined by calculating the skewness and kurtosis coefficients. It was also investigated whether there is a correlation between the variables of STDs, DBE and DC. Pearson correlation analysis was used for this purpose. Simple linear-regression analysis was utilised to evaluate the research hypotheses.

4 Results

4.1 Demographic results

In the first part of the questionnaire, the questions asked about the level of education, gender, age, income and average spending amount of the participants. According to the results obtained, the domestic tourist groups with the highest participation in the survey were 18-25 years old (110 people, 32.7%), males (208 people, 61.9%), and university graduates (114 people, 33.9%), with an income

of 22,001 TL and above (153 people, 45.5%), who were spending 5,501 TL and above on holiday in Istanbul (160 people, 47.6%). The lowest-participation groups were people aged 65 years and above (4 people, 1.2%), females (128 people, 38.1%), primary-school graduates (7 people, 2.1%), people with income between 15,001 and 18,500 TL (28 people, 8.3%), and those spending 1,001 to 2,500 TL on holiday (30 people, 8.9%).

4.2 Validity and reliability analysis

Before evaluating the hypotheses, the scales of STDs, DBE and DC were analysed in terms of their construct validity (EFA and CFA, convergent validity) and reliability [Cronbach’s alpha (α) and Composite Reliability (CR) coefficients]. Skewness and kurtosis coefficients of the scale variables were also calculated, and their suitability for parametric tests was evaluated.

In the first stage of the validity analysis, smart tourism destinations, destination brand equity and destination competitiveness variables were examined using explanatory factor analysis. In the EFA, the varimax rotation technique — one of the orthogonal rotation techniques used where there is no correlation between the factors — was utilised (Kalaycı, 2017). Before evaluating the EFA results, KMO values and significance values were also viewed, and Sharma’s (1996) opinion on this issue was taken into account. In addition, having at least three items in a dimension (MacCallum et al., 1999), not having a factor loading below 0.50 (Hair et al., 2010) and not being gathered under more than one factor (Büyüköztürk, 2015) were adopted as basic criteria for the evaluation of factor items and dimensions. As a consequence of the analyses carried out until these conditions were met — for example, the KMO Bartlett Test Result of all three variables was found to be above 0.90 and significant ($p = 0.00$) — two dimensions emerged in the STDs variable, which were named technology and innovation (TI) and accessibility (AC). Four dimensions emerged from the evaluation of the destination brand equity (DBE) variable, and they were named destination brand awareness (DBA), destination brand loyalty (DBL), destination brand image (DBI) and destination brand quality and value (DBQV). Finally, five dimensions emerged in the destination competitiveness variable, and these dimensions were named tourism infrastructure (TIN), destination image (DI), general infrastructure (GI), destination management (DM), and attributes of the destination (AD). The dimensions that emerged in all three variab-

les largely overlapped with the original scales. In addition, the general reliability of the three variables and the reliability of the dimensions were found to be high (Cronbach's alpha > 0.80) (Kayış, 2017).

After the EFA was completed, the models determined by EFA were also analysed using CFA. The purpose of following EFA with CFA was to test and verify to what extent the factor structure revealed by EFA fits the model to be tested with the hypotheses (Bayram, 2016).

The outcomes of the CFA are indicated in Table 2. The CFA examined χ^2/df , RMSEA, GFI, IFI and CFI goodness-of-fit indices, which are frequently considered in other studies. Aksu et al. (2017) deemed the acceptable limits of some of the fit indices to be $2 \leq \chi^2/df \leq 5$, $0.00 \leq RMSEA \leq 0.10$, $0.90 \leq CFI \leq 1.00$, $0.90 \leq IFI \leq 1.00$. According to

Anderson and Gerbing (1984), GFI values above 0.85 are within acceptable limits. The present study took these limits into account. Accordingly, the conclusion of the CFA was that the STDs model did not have acceptable goodness of fit values. Modifications were made between the items under the same dimension that required modification to reach acceptable values. According to the CFA that was repeated after the modification, acceptable goodness-of-fit index values were obtained ($\chi^2/df = 2.877$, RMSEA = 0.075, GFI = 0.922, IFI = 0.946, CFI = 0.946). These results confirmed our research model. As a result of the evaluation of the DBE variable with CFA, acceptable goodness of fit values were obtained ($\chi^2/df = 2.968$, RMSEA = 0.077, GFI = 0.889, IFI = 0.929, CFI = 0.929). Based on these results, the DBE model was validated.

Table 2: Confirmatory factor analysis (CFA)

Variables	Factor and Substance	Factor Load	Skewness	Kurtosis	AVE	CR	Cronbach's Alpha (α)
Smart Tourism Destinations (STDs)	Technology and Innovation (TI)		-0.501	0.941	0.47	0.88	
	STD15	0.779					
	STD17	0.740					
	STD16	0.789					
	STD14	0.710					
	STD13	0.685					
	STD20	0.657					
	STD19	0.648					
	STD18	0.639					
	STD12	0.511					0.911
	Accessibility (AC)		-0.154	-0.167	0.64	0.90	
	STD6	0.796					
	STD8	0.849					
	STD9	0.833					
	STD7	0.738					
	STD10	0.809					
STDs Compliance Indexes:	$\chi^2/df = 2.877$, RMSEA = 0.075, GFI = 0.922, IFI = 0.946, CFI = 0.946						
Destination Brand Equity (DBE)	Destination Brand Awareness (DBA)		-2.047	5.127	0.72	0.91	
	DBE2	0.905					
	DBE3	0.925					
	DBE4	0.822					
	DBE1	0.742					
	Destination Brand Loyalty (DBL)		-0.357	0.154	0.56	0.86	0.916
	DBE18	0.761					
	DBE19	0.815					
	DBE21	0.802					
	DBE17	0.687					
	DBE20	0.699					

(continued)

Variables	Factor and Substance	Factor Load	Skewness	Kurtosis	AVE	CR	Cronbach's Alpha (α)	
DBE Compliance Indexes:	Destination Brand Image (DBI)		-0.331	-0.109	0.62	0.87		
	DBE7	0.806						
	DBE8	0.803						
	DBE5	0.786						
	DBE6	0.770						
	Destination Brand Quality and Value (DBQV)		-0.066	0.156	0.48	0.82		
	DBE13	0.675						
	DBE14	0.842						
	DBE16	0.551						
	DBE15	0.749						
	DBE11	0.641						
	χ²/df = 2.968, RMSEA = 0.077, GFI = 0.889, IFI = 0.929, CFI = 0.929							
	Destination Competitiveness (DC)	Tourism Infrastructure (TIN)		-1.131	-0.048	0.62	0.93	
		DC12	0.805					
		DC14	0.864					
DC13		0.826						
DC15		0.777						
DC10		0.845						
DC8		0.837						
DC9		0.680						
DC11		0.674						
Destination Image (DI)			-0.048	-0.086	0.51	0.85		
DC35		0.616						
DC23		0.800						
DC34		0.744						
DC33		0.711						
DC24		0.773						
DC36		0.608						
General Infrastructure (GI)			-0.327	0.291	0.49	0.85	0.948	
DC19		0.751						
DC20		0.713						
DC18		0.708						
DC21		0.788						
DC17		0.635						
DC16		0.617						
Destination Management (DM)			-0.232	-0.361	0.56	0.86		
DC28		0.777						
DC29	0.862							
DC30	0.843							
DC27	0.652							
DC7	0.602							
DC Compliance Indexes:	Attributes of the Destination (AD)		-1.435	2.795	0.68	0.89		
	DC2	0.804						
	DC3	0.929						
	DC1	0.780						
	DC4	0.782						
	χ²/df = 2.504, RMSEA = 0.067, GFI = 0.851, IFI = 0.919, CFI = 0.918							

The conclusion of the CFA was that the DC model did not have acceptable values. In order to reach acceptable values, modifications were made between the items under the same dimensions. After repeating the CFA, acceptable goodness-of-fit values were obtained ($\chi^2/df = 2.504$, RMSEA = 0.067, GFI = 0.851, IFI = 0.919, CFI = 0.918). These results prove the verification of the proposed model.

The conclusions of the CFA were also analysed in terms of their convergent validity in the study. In convergent-pvalidity analysis, average variance extracted (AVE) and composite reliability (CR) values were analysed. Hair et al. (2010) state that in order for the data to meet the convergent validity conditions, $AVE \geq 0.50$, $CR \geq 0.70$ and $CR > AVE$. However, according to Fornell and Larcker (1981), even if the AVE value of the data is lower than 0.50, it is likely that the convergent validity conditions are met if the CR value is higher than 0.70. In this case, as can be seen in Table 2, the data can be said to meet the convergent validity conditions. Skewness values of the data were observed to be between -2.047 and -0.048 and the kurtosis values were between -0.361 and +5.127. According to Kline (2005), data is normally distributed when the skewness values are less than 3 and the kurtosis values are less than 10. These results met those criteria.

4.3 Hypothesis testing

The study first assessed whether there was a correlation between the variables. This assessment was made utilising Pearson correlation analysis. Then, simple linear regression analysis was performed on the variables that were related to each other within the framework of the research hypotheses.

This study found no significant and positive correlation between the DBA and AC dimensions ($r = 0.105$; $p > 0.01$), with a significant ($p < 0.01$) and positive correlation between all other variables. These results can also be seen in Table 3. In general, low- and medium-level correlations were found between the variables, and the highest significant correlation among the variables investigated by regression analysis was found between the DC and DBE variables ($r = 0.735$; $p < 0.01$). The lowest significant correlation was between DBL and AC ($r = 0.225$; $p < 0.01$) (Büyüköztürk, 2015).

Table 4 presents the consequences of simple linear regression analysis. In regard to the outcomes of the analysis, AC significantly and positively affected DBI ($F = 31.526$, $p = 0.00$), DBQV ($F = 57.556$, $p = 0.00$) and DBL ($F = 17.764$, $p = 0.00$). 8% of the total variance of DBI, 14% of the total variance of DBQV, and 5% of the total variance of DBL are clarified by the AC dimension.

TI had a significant and positive effect on DBA ($F = 35.866$, $p = 0.00$), DBI ($F = 49.630$, $p = 0.00$), DBQV ($F = 58.458$, $p = 0.00$) and DBL ($F = 52.260$, $p = 0.00$). 9% of the total variance regarding DBA, 12% of the total variance regarding DBI, 14% of the total variance regarding DBQV, and 13% of the total variance regarding DBL are clarified by the TI dimension.

We thus conclude that the STDs had a significant and positive impact on DBE in this study ($F = 89.938$, $p = 0.00$). In addition, DBA ($F = 137.944$, $p = 0.00$), DBI ($F = 164.635$, $p = 0.00$), DBQV ($F = 171.249$, $p = 0.00$), DBL ($F = 190.038$, $p = 0.00$), DBE ($F = 393.099$, $p = 0.00$), AC ($F = 49.202$, $p = 0.00$), TI ($F = 118.911$, $p = 0.00$) and STDs ($F = 118.988$, $p = 0.00$) have a significant and positive impact on DC.

Based on these results, 21% of the total variance with regard to DBE is clarified by the STDs variable. In addition,

Table 3: Correlation analysis

Variable	Mean	Std.	1	2	3	4	5	6	7	8	9
TI	3.0903	0.70318	1								
AC	2.8137	0.80175	.537**	1							
DBA	4.3906	0.80561	.311**	.105	1						
DBL	3.6101	0.75406	.368**	.225**	.542**	1					
DBI	3.5610	0.86170	.360**	.294**	.495**	.641**	1				
DBQV	3.1095	0.76811	.386**	.383**	.254**	.491**	.479**	1			
STDs	2.9915	0.65213	.929**	.811**	.262**	.354**	.378**	.436**	1		
DBE	3.6336	0.62177	.457**	.328**	.710**	.859**	.831**	.729**	.461**	1	
DC	3.6370	0.66135	.512**	.358**	.541**	.602**	.575**	.582**	.513**	.735**	1

N = 336 **p < 0.01 (two-way)

Table 4: Regression analysis

Variables		R	R ²	B	β	t	F	p
Independent Variable	Dependent Variable							
AC	DBI	0.294	0.086	0.316	0.294	5.615	31.526	0.000**
AC	DBQV	0.383	0.147	0.367	0.383	7.587	57.556	0.000**
AC	DBL	0.225	0.051	0.211	0.225	4.215	17.764	0.000**
TI	DBA	0.311	0.097	0.357	0.311	5.989	35.866	0.000**
TI	DBI	0.360	0.129	0.441	0.360	7.045	49.630	0.000**
TI	DBQV	0.386	0.149	0.422	0.386	7.646	58.458	0.000**
TI	DBL	0.368	0.135	0.394	0.368	7.229	52.260	0.000**
STDs	DBE	0.461	0.212	0.439	0.461	9.484	89.938	0.000**
DBA	DC	0.541	0.292	0.444	0.541	11.745	137.944	0.000**
DBI	DC	0.575	0.330	0.441	0.575	12.831	164.635	0.000**
DBQV	DC	0.582	0.339	0.501	0.582	13.086	171.249	0.000**
DBL	DC	0.602	0.363	0.528	0.602	13.785	190.038	0.000**
DBE	DC	0.735	0.541	0.782	0.735	19.827	393.099	0.000**
AC	DC	0.358	0.128	0.296	0.358	7.014	49.202	0.000**
TI	DC	0.512	0.263	0.482	0.512	10.905	118.911	0.000**
STDs	DC	0.513	0.263	0.520	0.513	10.908	118.988	0.000**

p < 0.05**

29% of the total variance concerning DC is explained by DBA, 33% by DBI, 33% by DBQV, 36% by DBL, 54% by DBE, 12% by AC, 26% by TI and 26% by STDs. As a result, all hypotheses except H_{2a} were accepted (H_1 , H_{1a} , H_{1b} , H_{2b} , H_{2c} , H_{2d} , H_{2e} , H_{2f} , H_{2g} , H_{2h} , H_3 , H_{3a} , H_{3b} , H_{3c} and H_{3d}).

5 Discussion

As a result of this research, all hypotheses except H_{2a} have been confirmed. Smart tourism applications in Istanbul were found to influence the branding process of destinations (Gretzel & Mendonça, 2019; Huertas et al., 2021; Lestari et al., 2022) and the competitiveness of destinations (Boes et al., 2016; Cavalheiro et al., 2021; Jeong & Shin, 2020; Liberato et al., 2018). These findings show that domestic tourists consider the smartness of the destination — and therefore its accessibility and openness to innovation — as a criterion for developing a positive attitude toward it and perceiving it as different from other destinations (Tavitiyaman et al., 2021), and when choosing to between destinations to visit and revisit (Corrêa & Gosling, 2021). The significant portion of the participants that were young people (110 of the people were aged 18-25) helps explain this acceptance

of smartness, technological sophistication, change and innovation trends (Trinchini et al., 2019) and dynamism (Gretzel, 2018) as important indicators in destination branding and competitiveness.

The results indicate that destination branding is one of the factors affecting DC. Studies in the literature also draw attention to this relationship (Ferns & Walls, 2012; Miličević et al., 2017; Rodríguez-Molina et al., 2019). In addition, destination brand awareness, destination brand image (Rodríguez-Molina et al., 2019), destination brand quality (Buhalis & Amaranggana, 2013; Liberato et al., 2018) and value, and destination brand loyalty (Payne, 1994) all positively influence the competitive advantage of a destination. These findings indicate that destinations that differentiate themselves through branding can gain a competitive advantage. Similar studies also highlight this relationship (Gómez et al., 2015; Miličević et al., 2017).

In light of these results, destinations should look to gain a competitive advantage through branding; increasing awareness through promotional and marketing tools; providing tourists with quality experiences (Novais et al., 2018); increasing brand value — as well as creating a loyal customer base, since this is less costly than acquiring new customers (Payne, 1994).

6 Conclusion

The outcome of this study has indicated that smart tourism practices in Istanbul have an impression on the brand value and competitiveness of the city as a tourist destination. This research also revealed that smart tourism practices are carried out in Istanbul, but the existing practices are inadequate. The theoretical and practical implications of this research, as well as limitations and suggestions for future research, are clarified in the following.

6.1 Theoretical implications

Theoretically, this study demonstrated that there is a positive correlation between smart tourism and the variables of DBE and DC. In addition, according to the results of this study, as smart tourism applications become more widespread in various destinations, those destinations have become more successful in the branding process, and their competitiveness has increased. The relationships between the three main variables of this study have never been previously examined in the literature. This study proposes a theoretical model (Figure 1) that has never been presented in the literature before and obtained positive results with it. Therefore, it can be stated that the study contributes to the literature by clarifying a topic that has not been studied in the literature before.

This study also concluded that DBE affects DC. Although the existence of a correlation between DBE and DC has been noted in the literature (Ferns & Walls, 2012; Rodríguez-Molina et al., 2019), few empirical studies have supported this theory (Kankhuni, 2020; Miličević et al., 2017). This research is one of the few studies in the literature that examines the relationship between these two variables.

6.2 Practical implications

In terms of the consequences of this research, the city of Istanbul has not fully realised its transformation into a “smart” tourism destination. The research results show that there are some problems in accessing services, especially for disabled citizens, and the information infrastructure is still inadequate. These results will serve as a reference point for the private sector, especially public organisations, to overcome existing shortcomings. The survey results show that domestic tourists who responded to the survey are not satisfied with these services.

With this in mind, the following suggestions can be made for Istanbul. If destinations improve their information and transport infrastructure services — which are the basic building blocks of smart tourism — they are likely to be more successful in the branding process and increase their competitive advantage in the market. The participants in this study see the transformation of destinations into STDs as a way for them to brand themselves and increase their competitive advantage. However, first and foremost, all infrastructure services, especially the ICT infrastructure in Istanbul, need to be improved, and the Internet and other communication tools need to be made more useful. The services provided can be personalised for consumers by increasing the number of up-to-date smart applications and ensuring that tourists have faster and more efficient access to services and receive accurate and timely information about these services.

Istanbul, with its overcrowded streets, has a serious traffic problem, according to respondents. Although new transport alternatives have recently been created in the city, existing transport facilities still cannot fully meet the needs of the city.

As a practical suggestion coming out of this study, it can be recommended that population planning should be applied to the city, existing transport facilities should be improved, and transport networks (e.g., the metro transport network) should be extended. It is also recommended that common areas (e.g., public transport vehicles, bus stops, footpaths, pedestrian walkways, flyovers, car parks, and recreational areas) in Istanbul should be improved to meet the requirements of disabled citizens and disabled tourists.

Sustainability is one of the critical matters in terms of smart tourism practices in the branding and competitiveness of destinations. In this context, practices can be implemented like promoting environmentally friendly electric vehicles in the city; encouraging environmentally friendly practices in businesses; increasing the number of green areas throughout the city; raising awareness of environmental protection among local people and tourists; and preventing unplanned, unsustainable construction that causes visual pollution; and taking more measures to protect historical buildings.

6.3 Limitations and future research

This study has some limitations. The fact that convenience sampling method was preferred in determining the

sample is one of the first of these. In future studies on this subject, random sampling methods could instead be used. In that way, it can be clearly seen whether different results emerge in studies where different sampling methods are used.

The second limitation of this study is that the data were obtained only from domestic tourists. Future studies might also collect data from foreign tourists. This would make it possible to compare whether domestic and foreign tourists have different views on this issue. The issue of smart tourism has not yet been sufficiently researched within the framework of tourists' opinions. This creates opportunities for further research examining the degree of transformation of cities into STDs, as well as the impact of smart tourism practices on the branding and competitiveness of destinations based on tourists' evaluations.

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Data availability statement

Researchers can benefit from the information and data in this paper, provided that the source is cited.

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Conflicts of Interest

The author declares no conflict of interest.

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