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Does Gamified Information Impact Destination Image and Visit Intention? An Experimental Design Study

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Destination Marketing Organizations (DMOs) often use texts and pictures to promote destinations in brochures and websites. However, this information presentation may fail to introduce the attractions and events effectively. One novel format designed to reduce boredom associated with the text format is the employment of game mechanics. This research adopted the experimental design to compare the effect of three formats of travel information, including text-based, Q&A, and gamified information. The findings show that gamified travel information strongly affects flow, destination image change, willingness to search for more information, and visit intention. Challenges and interactions make people active in reading the information. Additionally, flow experience is a crucial mediator in determining the effectiveness of gamified information. It is recommended that DMOs consider people's prior knowledge when applying gamification.

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Introduction

The provision of travel information services is an important way to promote destinations and increase visit intention. The appealing content delivered through travel information informs prospective tourists about the benefits of traveling to a destination. It consciously and unconsciously influences people's perceived destination image and trip decisions (Jeong et al., 2012; Pop et al., 2022). Despite the importance of the content, the information presentation formats play a crucial role in attracting people's attention and stimulating their reading interest. Destination Marketing Organizations (DMOs) have typically used texts about destinations accompanied by pictures in brochures and websites. However, traditional formats of information presentation (e.g., text and pictures) sometimes fail to trigger people's curiosity or to effectively convey the advantages of using a product or service (Wood & Lynch, Jr., 2002).

One novel format designed to reduce boredom associated with the text format is the employment of game mechanics (Abou-Shouk & Soliman, 2021; Müller-Stewens et al., 2017). DMOs have integrated game mechanics, such as rewards and challenges, with travel information to attract prospective tourists. For example, Tourism Toronto (Canada) designed a gamified website, *Yo Toronto*, to show tourist attractions engagingly and interestingly by including cartoon pictures, match games, Jurassic puzzles, and quiz games. Another example is Destination Ontario's (Canada) gamified advertisement, *Where Am I*. Instead of offering the images of the province's landmark attractions in the video, the ad showed a series of photos of lesser-known features and invited the audience to guess where they could be found.

There is no doubt that gamified information attracted more consumer attention than previous campaigns. For instance, more than 30,000 people guessed *Where Am I*, which pulled in over 2.6 million views in 12 days (Martin, 2016). However, the effect of gamified information

on people's perception and behavioral intention has not been investigated adequately. Even though several previous studies discussed that gamification could boost customer engagement (Shankar, 2021; van Nuenen & Scarles, 2021) and improve brand awareness (Xu et al., 2017), those studies were theoretical in nature, and only a small number of empirical studies have been conducted (Lee, 2022; Müller-Stewens et al., 2017; Pasca et al., 2021). Additionally, gamifying the tourism and hospitality content is not always associated with benefits; some drawbacks should be considered. Gamification needs IT teams and resources to create effective and high-quality content that entices people to play. Hence, service providers sometimes have to collaborate with an experienced vendor. The whole process can be both financially costly and time-consuming and requires extra efforts from the service providers (Sabornido et al., 2022). Additionally, a poorly designed gamified program or content can negatively affect players' willingness to engage with the gamified content and even jeopardize the user experience (Laskowski, 2013; Sabornido et al., 2022).

Another gap in previous studies is that researchers have not examined how gamified travel information may change destination image and behavioral intention. Inadequate investigation of how this occurs may pose obstacles to understanding the impact of gamification and designing effective gamified contexts. Researchers argue that playing games will lead people to experience flow and, in turn result in positive outcomes, such as brand awareness (Shankar, 2021; Whittaker et al., 2021) and purchase intention (Bittner & Schipper, 2014; Gao & Wu, 2022). Therefore, this research will use an experimental design to investigate whether flow experience impacts the effect of gamified travel information.

Gamification is especially important during and after the pandemic because people rely more on the Internet and virtual communication. There have been an increasing number of

gamification practices since the outbreak of COVID-19. For example, Tourism New Zealand designed *Play NZ* to encourage potential visitors to explore the country in the digital game (Spary, 2020). Cape Town Tourism launched a new global campaign in 2022, *Find Your Freedom*, which allows players to experience the destination virtually (Girma, 2022). The innovative and fun gamification elements can provide an engaging audience environment. Gamification is an effective strategy for delivering curricula material during COVID-19 (Alhalafawy & Tawfiq Zaki, 2022; Nieto-Escamez & Roldán-Tapia, 2021). Additionally, animation and gamification in online distance learning increased students' knowledge as well as motivation (Inangil, 2022). Gamification was also used to encourage Indigenous communities in Choco, Colombia to take actions to prevent COVID-19 transmission (Borzenkova et al., 2021). Gamification has been an innovative approach to delivering information and raising people's awareness (Nuanmeesri, 2021).

Overall, although the advantages of gamified content formats in DMO tourism information have been discussed, the effectiveness has not been investigated adequately. Furthermore, there is little research about mechanisms that explain the superior effect of a gamified versus a traditional information format. Therefore, the current research was conducted to address these gaps. This led to the following research objectives:

- To examine whether gamified travel information increases people's flow experience;
- To examine whether gamified travel information improves destination image, willingness to search for more information, and visit intention; and
- To investigate the mediating role of flow for the effect of gamified travel information on people's destination image change, willingness to search for more information, and visit intention

Literature Review

Gamified Information

Gamification is "the use of game design elements in non-game contexts" (Deterding et al., 2011, p. 2). It has been widely used to raise brand awareness, improve service quality, and enhance information presentation in marketing contexts (Adukaite & Cantoni, 2016; Baptista & Oliveira, 2017; Bittner & Schipper, 2014; Shankar, 2021; Whittaker et al., 2021). Gamified information is conceptualized as "the use of games as a vehicle for conveying information" (Müller-Stewens et al., 2017, p. 9). The critical characteristic of gamified information is that people can actively interact with the information through gameplay, which can generate positive psychological outcomes, such as autonomy and mastery (Bravo et al., 2021; Wolf, 2020). Gamified information not only shows the information about tourist attractions but also offers an engaging gaming experience.

DMOs have adopted various games, such as quiz games, match games, Jurassic puzzles, and spotting games, to gamify travel information and engage prospective tourists. Despite various game types employed, challenges and rewards are the most commonly used game mechanics (Table 1). Challenges refer to the need for players to take part in a contest, answer questions (Bai et al., 2022; Adukaite & Cantoni, 2016), or achieve a task by overcoming specific obstacles (Wolf, 2020), while rewards stand for incentives (e.g., monetary rewards, prizes) that players can receive by completing a game (Biel, 2016; Shankar, 2021). Challenge is important for gamified travel information because the uncertainty of the game outcomes keeps players curious, and the interaction engages players (Bai et al., 2022; Csikszentmihaly, 1990). When players have the skills to solve challenges with some efforts, they are likely to enjoy and concentrate more on the information (Li et al., 2019; Piao & Joo, 2022; Müller-Stewens et al.,

2017). In addition to challenges, some DMOs have used rewards to amplify the attractiveness of gamified travel information. According to Vroom's expectancy theory (1964), people are willing to put more effort into completing a task if desirable rewards are provided.

Gamified travel information offers a gaming experience and helps DMOs understand which tourist spots are more attractive to prospective tourists. Another advantage of gamification is that when players participate in games, the answers they submit (e.g., their favorite attractions and interesting events) may be analyzed to give insights into tourists' preferences for activities available in a certain destination. For example, through the *Ontario Colorful Spring Tour*, Destination Ontario learned that prospective tourists favored the Ottawa Tulip Festival and Toronto Sakura Blossoms.

[Insert Table 1 Here]

In addition to gamified information, DMOs use text-based or question-and-answer (Q&A) formatted information to introduce attractions and travel tips. Q&A formatted travel information is presented as a series of frequently asked questions and answers about destinations, which aim to stimulate prospective tourists' interest and make the information easier to follow (Israel, 2009). For example, Visit Britain lists several questions that prospective tourists may ask and includes answers after each question. For instance, it poses the question, "Does it really rain all the time?" and provides an answer regarding the amounts of sunshine and rain across seasons in London. Compared to the text-based version, this pair of Q&A makes the information easier to follow and triggers readers' curiosity.

Although both gamified (e.g., quiz games) and Q&A formatted travel information include questions, there are significant differences: Gamified information requires players to complete challenges, guess the answers, and take actions, such as submitting their responses and receiving

feedback. The challenges and interactions make people active in reading the information. In contrast, readers of Q&A formatted information does not experience challenge and interaction and thus remain passive since answers are provided for them immediately after questions.

Researchers have argued that information presentation formats will significantly influence persuasion outcomes (Choi & Gil-Garcia, 2022). Therefore, this research will examine the effect of text-based, Q&A formatted, and gamified travel information on people's perceived destination image, willingness to search for information, and visit intention. In addition, it will bridge the previous literature gap as no known research has compared the differences among these three critical formats of travel information.

Flow Theory

Flow is defined as "the holistic sensation that people feel when they act with total involvement" (Csikszentmihalyi, 1977, p.36), and it is "a psychological state in which the person feels simultaneously cognitively efficient, motivated, and happy" (Moneta & Csikszentmihalyi, 1996, p.277). The three dimensions of flow include concentration, enjoyment, and curiosity: concentration refers to people being fully involved in an activity; enjoyment highlights people's intrinsic interests and their psychological state of having pleasure; while curiosity stands for the desire to acquire new knowledge or new sensory experience (Ghani & Deshpande, 1994; Kim & Kim, 2022; Lee, 2022). When individuals are in a flow state or have a flow experience, they will enjoy participating in activities or completing tasks without external rewards.

Flow theory emphasizes that the context is an essential factor that influences to what extent individuals get involved in an activity and experience flow (Ghani & Deshpande, 1994). Flow commonly appears in interactive contexts such as playing games (Kim & Kim, 2022) and

learning (Chang et al., 2017). The antecedents of flow include adopting a clear goal, receiving instant feedback, and experiencing challenges that match skills (Csikszentmihalyi, 1990; Ghandvar et al., 2022). People are said to have a flow experience when they feel that there is a good balance between the perceived challenges of the task and their perceived skills (Csikszentmihalyi, 1977; Ghandvar et al., 2022).

The challenges embedded in an advertisement or information can generate a flow experience, so gamification has been treated as a marketing innovation (Whittaker et al., 2021; Xu & Chen, 2018). Furthermore, the interaction with gamified information encourages players to participate and results in their engagement and concentration (Burke, 2014; Negruşa et al., 2015), and the process of solving challenges brings a sense of curiosity and enjoyment (Lee, 2022). Since gamification results in higher concentration, curiosity, and enjoyment than other formats – three essential dimensions of flow –, gamification likely elicits more extraordinary flow experiences. Thus, this research proposes that:

H1: Gamified travel information will result in a higher flow experience than text-based or Q&A formatted travel information.

Researchers have argued that gamification positively affects attitude and perception (Sreejesh et al., 2021). Gamified contexts offer fun and interesting experiences, motivating people to participate in them (Alhalafawy & Tawfiq Zaki, 2022; Huotari & Hamari, 2012). The increased engagement and efforts make the information more memorable, which in turn influences people's perceptions and attitudes (Wang, 2006; Sreejesh et al., 2021). Therefore, gamified information will lead to positive attitudes toward the destination (Jeong, 2009).

The flow generated by gamified information can motivate people to process messages and change people's perceptions (Loewenstein, 1994; Müller-Stewens et al., 2017). When people feel

that there is a good match between their skills and challenges, they may engage in the gamified context and have a flow experience, which leads them to allocate more cognitive resources for solving challenges and remembering the information (Burke, 2014; Müller-Stewens et al., 2017; Nair, 2021). Since people perceive and remember more positive information about the destination, the information will effectively change people's perceived destination image (Bojanic, 1991; MacKay & Fesenmaier, 1997). Therefore, compared with either the text or the Q&A format, the gamified format will generate a greater flow experience among participants, resulting in a more positive destination image. This gives rise to the following hypotheses:

H2a: The gamified format will lead to a better perceived destination image than either the text-based or the Q&A format.

H2b: The flow experience mediates a more favorable destination image obtained through the gamified format than the text-based or the Q&A format.

Additionally, researchers have argued that gamified information will increase people's information acquisition (Lee, 2019), innovation adoption (Müller-Stewens et al., 2017), and purchase intention (Bittner & Shipper, 2014). In the tourism context, engaging and interesting travel information enhances people's perceived advantages of traveling to the destination, thereby increasing their intention to search for more information about the attractions (Ho et al., 2012) and visit intention (Jeong, 2009; Molinillo et al., 2018). Wolf (2020) argued that engaging information would lead people to be persuaded and behave in line with the message argument. Researchers have put forward that gamified information or ads, as a type of experiential marketing, will have stronger effects on attitude change and behavioral intention than traditional information formats.

The flow experience generated through the gamified format will generate greater willingness to search for more information. The gamified information makes people complete the questions and raises their curiosity about the answers. As part of flow experiences, this curiosity reminds individuals of their knowledge gaps and stimulates their interest in processing new messages (Lee, 2022; Loewenstein, 1994). As a result, individuals will search for more information to satisfy their curiosity and fill their knowledge gap (Park et al., 2015). Therefore, this research proposes the following hypotheses:

H3a: The gamified format will result in a significantly greater willingness to search for more information about the destination than the text-based or the Q&A format.

H3b: The flow experience mediates greater willingness to search for more information obtained in the gamified format than the text-based or the Q&A format.

In addition to the positive effect of gamified information on intention (Aydınlıyurt et al., 2021; Bittner & Shipper, 2014), flow has been argued as a mediator between the formats of information presentation and intention (Cho & Kim, 2012). From the perspective of experiential marketing, game mechanics may engage consumers personally and more effectively advocate the benefits of a product or service, leading to stronger purchase intentions (Luo et al., 2011; Müller-Stewen et al., 2017). Since researchers argue that gamified information or advertisements could help marketers increase customers' purchase intention, gamified travel information may also effectively impact people's visit intention (Mucollari & Samokhin, 2017).

H4a: The gamified format will result in significantly higher intention to visit the destination than either the text-based or the Q&A format.

H4b: The flow experience mediates higher intention to visit the destination obtained in the gamified format than either text-based or Q&A format.

Method

Design and Development of Stimulus Materials

This research used the travel information of London and Vienna as research contexts. Using two cities ensured that the stronger effect of gamified versus text-based or Q&A formatted travel information is not specific to one destination. Additionally, this research used asking questions and requiring answers as the main component of the gamified format, which is a common way to gamify travel information by DMOs (e.g., Destination Ontario, Tourism Toronto, TURESPAÑA, and The London Pass).

A pilot study was conducted to test the effect of the designed gamified content. Fourteen participants were invited to play the gamified information, a multiple-choice quiz game. Since they had not visited the attractions before, participants found it difficult to answer these questions. They suggested some clues should be provided so that they can enjoy guessing answers. Therefore, some clues were embedded in the quiz games. For example, the weight of Big Ben's bell is introduced before people are invited to answer the related quiz question. Even though they are exposed to the introduction, they still need to think about the question, retrieve the information from their memory, and make an effort to answer the question correctly. Overall, the revised condition lowered the difficulty of challenges as clues were included. This change reflected that the level of challenges should match players' skills.

The primary purpose of this research was to compare the differences between three types of formats for travel information: text-based, Q&A, and gamified information. Since London and Vienna were used as cases to examine the different effects, their appearance sequence in each condition was also examined to exclude the influence of varying appearance sequences.

Therefore, a 3 (travel information format: text-based, Q&A, and gamified information) × 2 (sequence of the travel information of London and Vienna) between-subjects experimental design was conducted. For one-half of the participants, the travel information about London and related questions were presented first, followed by the travel information about Vienna and associated questions. This order was inverted for the other half of the participants.

Based on the discussion with a panel of tourism experts, each website contained three historical attractions, one natural attraction, and one man-made attraction: the manipulated website of London had the Tower of London, Big Ben, Tower Bridge, Hyde Park, and London Eye while that of Vienna contained Schönbrunn Palace, Belvedere Palace, Spanish Riding School, Volksgarten, and Prater. These attractions covered diverse categories of famous tourist spots in each city and allowed the survey to be of a reasonable length. Wix.com was used to present travel information and construct experimental stimuli to manipulate different conditions. All the travel information was from the official travel websites of London (https://www.visitlondon.com/) and Vienna (https://www.wien.info/en). The website design (e.g., navigation bar, logo) was made similar to that of official travel websites.

The manipulated text-based travel information had a website for each of the cities that introduced their five attractions. One example is shown on the left of Figure 1. The Q&A formatted travel information had the same introduction, but two questions and answers were added for each attraction (Figure 1, Right). As this format presented questions and answers on the same page, it did not challenge readers. Lacking challenges and interaction was a difference between the Q&A format and gamified travel information. The latter included quiz challenges: players were invited to guess the attraction depicted in the picture and answer the True or False questions (Figure 2). Once players completed the challenge game, a score showed how many

questions they had answered correctly. Asking readers to guess the answers was crucial to gamification because it nudged people to think about the information, made them curious about the answers, and gave them enjoyment if they answered questions correctly. The other conditions had the same content, but inverted the order of the Vienna and London websites.

In addition to the first pilot study, two-round pilot studies were conducted to improve the design of the conditions and questionnaire. In the second pilot study, 16 participants reviewed all six conditions and completed survey questions followed by a short interview. They were asked their opinions of the different conditions and suggestions regarding the content. Participants thought the gamified information was more interesting and interactive than the text-based and Q&A formats. The clues engaged them in playing the quiz games and they enjoyed learning more about the destinations. It also enhanced their perceived image of London and Vienna, making them want to visit these two cities in the near future.

[Insert Figure 1 & Figure 2 Here]

The third pilot study tested the effects of the manipulated conditions. The surveys were distributed through Dynata. This online panel was also used later as part of the formal data collection. Using the same platform to distribute surveys reduced the discrepancy of different respondent pools. Forty-eight respondents were randomly assigned to one of the six conditions and asked to complete the survey. One open-ended question was included at the end: "*This is a pilot study. Have you noticed anything strange or problematic in the questions? I will improve the survey based on your suggestions*." This allowed the researchers to identify potential issues and further improve the questionnaire. The results of the 48 respondents had good reliability, and the format of travel information was a significant factor influencing the effect of the information.

The pilot study had satisfactory results, and respondents had no concerns about the questionnaire.

Participants and Procedure

The online panel company Dynata was used to recruit participants for the formal data collection between September and October in 2019. This approach allows researchers to set demographic and screening criteria to target participants. Studies report that Millennials and Z (MZ) generations are digital natives and more interested in gamified products or services (Bittner & Schipper, 2014; Skinner et al., 2018). Therefore, Millennials (born between 1980-1995) and Generation Zers (born between 1996 and the late 2000s) were invited to participate in this research (Stergiou et al., 2018; Zopiatis et al., 2012). Since London and Vienna were the cases, people who had already visited these two cities were screened out.

The respondents were randomly assigned to one of the six conditions: 3 (travel information format: text-based, Q&A formatted, and gamified version) × 2 (sequence of London and Vienna travel information). For example, participants were presented with a website for the first destination (e.g., London), which may take text, Q&A, or gamified formats. After they read or interacted with the information, they were asked to answer a series of questions about their flow experience, changes in their image of the destination, willingness to search for more information, and intention to visit the destination. Participants were then presented with identical questions for the second destination as for the first one. They indicated their education level, birth year, and gender at the end of the survey.

Two verification questions were included to ensure that participants read the London and Vienna websites: How many attractions are introduced on the website of London/Vienna? If

participants did not answer correctly, they were screened out from this research. In addition, two reverse-worded items were used to eliminate acquiescence bias. If participants had contradictory answers, their responses were removed from the data. This research recruited 336 participants in total, but 36 were excluded because of the poor quality of responses. The final dataset has 300 valid responses, evenly split by gender.

Measures

The measurement of flow (i.e., concentration, perceived enjoyment, and curiosity), perceived learning, change in the destination image, willingness to search for more information, and visit intention were derived from literature and adapted to this research topic (Table 2). Participants were asked to indicate the level of flow they experienced, specifically, concentration, perceived enjoyment, and curiosity, using a 7-point scale.

[Insert Table 2 Here]

Data Analysis

First, the responses to London and Vienna were separated into two datasets. The format of travel information and the appearance sequence of London and Vienna were coded as two categorical variables. Second, a confirmatory factor analysis (CFA) was conducted to examine the reliability, convergent validity, and discriminant validity of the four constructs, including flow, destination image change (DIC), willingness to search for more information (WSI), and visit intention (VI). Third, the mean values of the items were calculated to represent constructs. These values were compared using 3 × 2 ANCOVA with education level, age, and gender as covariates to test whether the formats of information and the appearance sequence of London and

Vienna influenced people's flow, destination image change, willingness to search for more information, and visit intention. Lastly, the mediating effect of flow and the relationships among the constructs were examined using Mplus.

Results

Measurement Model

CFA was used to assess the adequacy of the flow, DIC, WSI, and VI measures for the London and Vienna data, separately. Flow was measured as a second-order factor, and the first-order factors included concentration, perceived enjoyment, and curiosity. The CFA results showed that the constructs had good composite reliability, convergent validity, and discriminant validity. For the London dataset, the flow, DIC, WSI, and VI constructs had satisfactory composite reliabilities based on calculation: the lowest reliability coefficient was 0.889, above the cut-off point of 0.7. The average variance extracted values (AVEs) of flow, DIC, WSI, and VI were 0.890, 0.839, 0.869, and 0.877, respectively. They were all greater than 0.5, showing good convergent validity. Additionally, as the smallest square root of AVE ($\sqrt{AVE_{DIC}} = 0.916$) was larger than any correlation between the two constructs, and discriminant validity was achieved (Anderson & Gerbing, 1988). All four constructs also had satisfactory composite reliabilities for the Vienna dataset: 0.893 was the smallest one. The AVEs of flow, DIC, WSI, and VI were 0.873, 0.807, 0.838, and 0.888, respectively, suggesting good convergent validity. Additionally, the smallest square root of AVE ($\sqrt{AVE_{DIC}} = 0.898$) was larger than any correlation between the two constructs, indicating discriminant validity was achieved (Anderson & Gerbing, 1988).

These measurement models for the two destinations also had good fit indices. The goodness of fit index (GFI), incremental fit index (IFI), and normed fit index (NFI) all exceeded

0.9; the comparative fit index (CFI) was over 0.93; the RMSEA was less than 0.1 (Anderson & Gerbing, 1988). Since the sample size of this study was greater than 200, and although the chi-square was significant ($p < 0.001$), the other indices indicated the measurement model was good.

Mean Values and Comparisons

The constructs in the models had good composite reliability, convergent validity, and discriminant validity, so each construct (i.e., flow, DIC, WSI, and VI) was represented by a one-index score. This research compared the mean values of the four constructs in the six conditions to examine the impacts of formats and appearance sequence of London and Vienna. Table 3 shows an overview of the variables' mean values and standard deviations.

A two-way ANCOVA was conducted to analyze whether the means were significantly different based on the three formats (i.e., text-based, Q&A formatted, and gamified) and the appearance sequence of London and Vienna. The impact of the sequence of the cities and the effect of the interaction between information format and sequence were not significant nor were the covariates, including education level, age, and gender.

Based on the ANCOVA analysis, the formats had a significant main effect on flow: F (2, 291) = 83.933, $p < 0.001$ for London; F (2, 291) = 80.278, $p < 0.001$ for Vienna. Specifically, as shown in the mean comparisons in Table 3., participants who received gamified information had significantly higher flow than those who read text-based or Q&A formatted information. Thus, H1 was supported.

The formats had a significant main effect on perceived destination image: F(2, 291) = 38.732, $p < 0.001$ for London; F(2, 291) = 37.001, $p < 0.001$ for Vienna. Specifically, gamified

information also led to a significantly greater increase in perceived destination image than the other information formats. Thus, H2a was supported.

Additionally, the formats had a significant main effect on willingness to search for more information about the destination: F (2, 291) = 46.013, $p < 0.001$ for London; F (2, 300) = 35.057, $p < 0.001$ for Vienna. Specifically, the gamified format resulted in a significantly greater willingness to search for more information about the destination than the text-based and Q&A formats. Thus, H3a was supported.

Lastly, the formats had a significant main effect on intention to visit the destination: F (2, 291) = 21.997, $p < 0.001$ for London; F (2, 291) = 17.225, $p < 0.001$ for Vienna. The gamified format led to significantly higher intention to visit the destination – London: F (2, 291) = 21.997, $p < 0.001$, Vienna: F (2, 291) = 17.225, $p < 0.001$ – than the text-based and Q&A formats. Thus, H4a was supported.

The constructs in the text-based travel information had the lowest mean values, indicating that compared to the other two formats, the text-based version had the least effect. As this research adopted a 7-point scale, the midpoint value is 4. Some mean values were less than 4 in the text-based condition, indicating that respondents disagreed that the text-based travel information increased their willingness to search for more information and intention to visit the destination.

[Insert Table 3 Here]

Mediation Models

A mediation analysis in Mplus was conducted on the datasets of London and Vienna to investigate whether flow mediated the effects of gamified information compared to text-based or Q&A formatted information on DIC, WSI, and VI (i.e., H2b, H3b, H4b).

Preacher and Hayes' (2004) bootstrapping method was used to test mediation, and 500 times of bootstrapping were used. The mediation hypothesis for the effects of gamified versus text-based travel information for London on DIC, WSI, and VI was examined first (See Figure 3 for estimates of the paths). Compared with the text-based format, gamified travel information significantly increased flow experience ($\beta = 0.662$, $p < 0.001$), and then flow had a statistically positive effect on DIC ($\beta = 0.624$, $p < 0.001$), WSI ($\beta = 0.712$, $p < 0.001$), and VI ($\beta = 0.397$, $p < 0.001$).

As shown in Figure 3, once flow was entered as a mediator, the direct effects of gamified versus text-based travel information on DIC and WSI were not significant (Figure 3). The bootstrapping analyses (Preacher & Hayes, 2004) provided the point estimate of the indirect path from the gamified versus text format comparison on each of the three dependent variables and its 95% confidence interval (CI). The mediation path to DIC via flow was estimated to be 0.414 with 95% CI [0.326, 0.501]. It should be noted that a 95% confidence interval not including zero indicates that the mediation path is significantly different from zero at $p < 0.05$. Similarly, the mediation path to WSI via flow was estimated to be 0.472 with 95% CI [0.386, 0.558]. These findings indicate that flow fully mediated the gamified versus text-based format comparison on DIC and WSI. Differently, the direct effect of gamified versus text-based travel information on VI was still significant ($p < 0.05$) after flow was entered, so the flow was a partial mediator for this effect. The mediation path to VI via flow was estimated to be 0.263 with 95% CI [0.173,

0.353]. 95% confidence interval did not include zero, which indicates that the mediation path is significantly different from zero at $p < 0.05$. These findings supported the mediation hypotheses for the gamified versus text format comparison for the London data.

The same approach was used to test the mediation hypothesis (See Figure 4 for estimates of the paths). Compared with the text-based format, gamified travel information led to a significantly higher flow experience ($\beta = 0.650$, $p < 0.001$), which resulted in greater DIC ($\beta = 0.721$, $p < 0.001$), WIC ($\beta = 0.746$, $p < 0.001$), and VI ($\beta = 0.486$, $p < 0.001$).

When flow was entered as a mediator, none of the direct effects of gamified versus text-based travel information on DIC, WSI, and VI were significant (Figure 4). Flow was a full mediator of the effects of gamified versus text-based travel information for Vienna according to the results of bootstrapping analyses (Preacher & Hayes, 2004). The mediation paths to DIC, WSI, and VI via flow were estimated to be: 0.469, with 95% CI [0.395, 0.542]; 0.485 with 95% CI [0.415, 0.554]); and 0.316 with 95% CI [0.235, 0.397], respectively. It should be noted that a 95% confidence interval not including zero indicates that the mediation path is significantly different from zero at $p < 0.05$. These findings supported the mediation hypotheses for the gamified versus text format comparison for the Vienna data.

[Insert Figure 3 & Figure 4 Here]

The mediation hypotheses for the effects of gamified versus Q&A formatted travel information for London and Vienna on DIC, WSI, and VI were examined (See Figure 5 and Figure 6 for estimates of the paths). Compared with the Q&A format, gamified travel information led to significantly higher flow experiences (London: $\beta = 0.340$, $p < 0.001$; Vienna: $\beta = 0.366$, $p < 0.001$), which resulted in greater DIC (London: $\beta = 0.525$, $p < 0.001$; Vienna: $\beta =$

0.503, $p < 0.001$), WIC (London: $\beta = 0.485$, $p < 0.001$; Vienna: $\beta = 0.487$, $p < 0.001$), and VI (London: $\beta = 0.220$, $p < 0.01$; Vienna: $\beta = 0.168$, $p < 0.05$).

As shown in Figures 5 and 6, once flow was entered as a mediator, direct effects of gamified versus Q&A formatted travel information for London and Vienna on DIC, WSI, and VI were still significant. The bootstrapping analyses (Preacher & Hayes, 2004) showed that the mediation path to DIC via flow was estimated to be 0.178 with 95% CI [0.117, 0.240] for London and 0.410 with 95% CI [0.275, 0.546] for Vienna. Similarly, the mediation path to WSI via flow was estimated to be 0.165 with 95% CI [0.108, 0.222] for London and 0.420 with 95% CI [0.269, 0.571] for Vienna. Additionally, the mediation path to VI via flow was estimated to be 0.075 with 95% CI [0.027, 0.123] for London and 0.194 with 95% CI [0.047, 0.341] for Vienna as all these 95% confidence intervals did not include zero, indicating that the mediation path is significantly different from zero at $p < 0.05$. These findings showed that flow was a partial mediator for the gamified versus Q&A format comparison on DIC, WSI, and VI for London and Vienna.

[Insert Figure 5 & Figure 6 Here]

Discussion and Conclusions

This research investigated the effect of gamified travel information on people's perceived destination image and behavioral intention. The experimental design was adopted as an approach to test the three formats of travel information, including text-based, Q&A, and gamified information. As gamification is a relatively new topic, there are a few examples that could be used for research purposes. The experimental design allowed the researchers to compare and contrast the different effects of information on flow, DIC, WSI, and VI. Three-round pilot

studies were conducted to design and develop the three different formats of travel information. Researchers also conducted interviews in pilot studies to refine the stimulus materials. Additionally, two cities (London and Vienna) were used as cases so that the results would not only be applied to one city. Some verification questions were also asked to make sure the participants actually paid attention to the travel information. This method to test the effects of different formats of travel information sets an example for the researchers who wish to adopt experimental design and investigate the impacts of gamification or new technology.

The findings of this research show that gamified travel information has a stronger effect on flow, DIC, WSI, and VI compared to the text and Q&A formatted information. Flow experience is a crucial mediator influencing gamified travel information. Although gamification has been discussed intensively in the past ten years, its development was slow. As a result, some practitioners started to argue about the effectiveness of gamification. This research found that gamified information could lead to more positive destination image change, higher willingness to search for information, and more intention to visit a destination. However, providing players with a flow experience is the key, without which gamified context is not necessarily better than a non-gamified context. This was reflected by the full mediating effect of flow experience for the comparison between gamified and text-based travel information. Differently, flow experience plays a partial mediating role in the comparison between gamified and Q&A formatted information. It indicated there was not only a significant relationship between flow experience and DIC, WSI, and VI, but also a direct relationship between the comparison between the gamified and Q&A formatted information. The interactivity of gamified travel information allows players to explore the information more engagingly. Therefore, gamified information is better than just presenting the questions and letting players guess and read the answers, like the

Q&A format. The findings highlighted the critical rule of interactivity in designing gamified contexts.

Theoretical Implications

This research is the first known study empirically examining the effect of gamified travel information on destination image change and visit intention. It fills the previous literature's gap by examining how and to what extent gamification can enhance the effect of travel information (Xu et al., 2017). People enjoy and engage in reading gamified information compared to other tested formats. The interaction of the gamified information triggers participants' reading interest and curiosity. It also leads participants to have a higher flow experience, which results in a more favorable destination image change, greater willingness to search for more information, and higher intention to visit the destination. However, the impact of gamified information on visit intention is relatively weak, as participants only slightly agreed that the information nudged them to visit the destination. It is consistent with the previous literature that the effect of travel information on visit intention is limited as other factors can significantly influence people's travel decisions, such as income, travel interest, and gender (Huang & van Der Veen, 2019; Jeong, 2009). The results indicate that applying gamification can increase visit intention, but other influential factors should also be considered.

Flow experience, as a mediator, contributes to the literature on the underlying drivers of destination image change, search intention, and visit intention. Flow was a significant mediator for the effect of gamified information compared to the other two formats of information. Although both gamified and Q&A formatted travel information include quiz questions, the Q&A version does not pose any challenges and lacks interaction. The unique elements of gamification,

challenges, and interaction play an important role in generating flow experience (Shen & Joppe, 2018). The positive effect of gamification on engagement, brand awareness, and purchase intention has been widely discussed by researchers (Mucollari & Samokhin, 2017; Shankar, 2021), but it does not mean gamifying a non-game context will always result in positive outcomes. Whether the gamified context could lead to a flow experience is decisive for its effect. The interviews in the pilot studies of this research indicate that people did not enjoy playing with gamified travel information if the quiz questions were too challenging. This finding aligns with Csikszentmihalyi's flow theory (1977): applying the game mechanic of challenge needs to consider the capability of the targeted group. If people perceive their skills cannot solve the problem, they may not want to participate in the game.

Practical Implications

From a practical perspective, the comparisons between text-based, Q&A formatted, and gamified travel information allow DMOs to understand which format is more effective in forming a positive destination image and behavioral intention. It is worthwhile to initiate gamified travel information because it can more effectively engage potential tourists, convert them into actual tourists, provide them with a good impression of the destination, and result in better persuasion outcomes. However, even though Q&A formatted travel information has a better effect compared to the text-based version, it is not as effective as gamified information. Furthermore, it is worth noting that gamified travel information is an additional layer to other destination promotion strategies while also boosting search intention and improving destination image.

It is recommended that DMOs consider people's prior knowledge when applying gamification. Some DMOs have used multiple-choice quiz games for this purpose. For example, the Spanish Tourism Institute initiated a game *How much do you know about Spain*, which asks players about Spain's history, culture, and attractions. However, this game may be challenging for prospective tourists with little knowledge about Spain. If the challenge is too difficult for them to complete, then the gamified information may not successfully offer a flow experience and is less likely to result in people's positive perception and behavioral intention. It is suggested that providing some clues (both texts or images) or additional educational content to lower the difficulty of challenges could better engage players. Also, question ordering (e.g., easy to challenging to easy) can be employed to make the users feel like they are on a roller coaster while providing an explanation to help them learn from their participation.

Limitations and future research

This research adopted challenges as a game mechanic to gamify travel information. Quiz games were used to present the attractions in London and Vienna. The findings supported that travel information integrated with challenges more effectively generates a flow experience, changes people's perceived destination image, and influences their behavioral intention. However, quiz games are only one format of gamification. Future research could examine how other formats or game mechanics (e.g., rewards and fantasy) influence the effectiveness of gamified travel information. It will shed light on how to better apply gamification and maximize its effect.

Millennials and Z (MZ) generations are the focus of this study because they are digital-first and digital-only generations, and most gamification cases rely on websites or mobile apps.

However, Generation Xers are also an important market segment with strong buying power for travel services (Kow, 2018). They may also be as capable as Millennials in completing digital tasks (Neal & Wellins, 2018). Therefore, future research could investigate Generation Xers' attitudes to gamified travel information as well as the effect of gamified travel information on their perception and behavioral intention. The findings will give insights into the different market segments for the application of gamification.

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Tables

Table 1. Examples of gamified travel information

Organization or companies	Gamification examples	Game mechanics
Destination Ontario	*Where Am I*: People were invited to play a riddle game and guess which destination Where Am I is describing. They could answer the open-ended questions on WhereAmI.com and browse travel information.	Challenges
	Fantastic Ontario Family Trip: People were invited to answer online multiple-choices questions to create customized family vacation itineraries and browse travel information.	Challenges
	Ontario Colorful Spring Tour: This gamified travel information offered a story narrative. People could explore four Ontario spring experiences (i.e., Ottawa Tulip Festival, Toronto Sakura Blossoms, Niagara Fall Butterfly Museum, and Blue Mountain Village) and shared their favorite destinations on social media to win printed game gifts.	Rewards
Tourism Toronto	*Yo Toronto*: This is a gamified travel information website for kids. Kids can browse the interactive map, play different kinds of games (e.g., match games, Jurassic puzzles, roller coaster maze, and quiz games), and learn fun facts about the attractions in Toronto.	Challenges
The Spanish Tourism Institute (TURESPAÑA)	*How much do you know about Spain?:* This is a multiple-choice quiz game. People are invited to guess 16 fun facts about Spanish cuisine, arts, and tourist attractions. The website shows the correct answers and provides travel information to learn more about Spain.	Challenges
Commission for the Promotion of Peru for Exports and Tourism (PROMPERÚ)	*Wings of Peru (Discover the Birds of Peru)*: People are invited to find the birds hidden in the pictures of Peru, win a free trip to the country, read stories about amazing bird species, and learn about how Nature Conservancy is working to preserve Peruvian habitats.	Challenges and rewards
The London Pass	*Which London attraction should I visit?*: This is a quiz game followed by the travel information of London attractions. Through completing quiz questions, people receive suggestions about which London attraction they should visit as well as related travel information.	Challenges

Table 2. Measurement of constructs

Constructs	Sources
Flow	Koufaris (2002)
Concentration	
I was absorbed intensively in reading the travel information.	
My attention was focused on the travel information.	
I concentrated fully on the travel information.	
I was deeply engaged in reading the travel information.	
Perceived enjoyment	Koufaris (2002)
Reading the travel information was interesting.	
Reading the travel information was enjoyable.	
Reading the travel information was fun.	
Reading the travel information was exciting.	
Curiosity	Hill et al. (2016)
I was curious about the attractions when I read the travel information.	
I was interested in the attractions when I read the travel information.	
I was excited when I read the travel information.	
The travel information stimulated my curiosity.	
Destination image change (DIC)	San Martin and Rodriguez del Bosque (2008); Li et al. (2009)
My knowledge about London/Vienna changed after I read the travel information.	
My feeling about London/Vienna changed after I read the travel information.	
I have a different perception of London/Vienna after reading the travel information.	
Willingness to search for more information (WSI)	Brucks (1985)
This website nudged me to search for more information about London/Vienna.	
I would like to search for more information about London/Vienna.	
I will search for more information about London/Vienna.	
Visit intention (VI)	Beatty and Ferrell (1998)
This website nudged me to plan a trip to London/Vienna.	
I plan to visit London/Vienna in the next three years.	
I hope to visit London/Vienna in the next three years.	
I will visit London/Vienna in the next three years.	

Table 3. Mean values, standardized deviations, and p-values

City and constructs	Text-based information		Q&A formatted information		Gamified information	
	Mean	SD	Mean	SD	Mean	SD
London						
Flow	4.386[a]	0.979	5.375[b]	0.749	5.904[c]	0.732
Destination image change	4.290[a]	1.099	4.820[b]	1.023	4.906[c]	1.175
Willingness to search for more information	3.987[a]	1.417	4.725[b]	1.164	5.680[c]	0.976
Visit intention	3.530[a]	1.509	4.275[b]	1.452	4.995[c]	1.452
Vienna						
Flow	4.162[a]	1.165	5.233[b]	0.830	5.887[c]	0.832
Destination image change	4.325[a]	1.264	4.850[b]	1.058	5.690[c]	1.022
Willingness to search for more information	3.992[a]	1.371	4.820[b]	1.213	5.580[c]	1.026
Visit intention	3.360[a]	1.453	3.875[a]	1.452	4.695[b]	1.610

Note: 7-point scale: 1 = strongly disagree, 7 = strongly agree; comparison based on Bonferroni, a, b, c stands for significance at 0.05 level

Figures

Big Ben

The Houses of Parliament and Elizabeth Tower, commonly called Big Ben, are among London's most iconic landmarks and must-see London attractions. Technically, Big Ben is the name given to the massive bell inside the clock tower.

Big Ben weighs more than thirteen tons (13,760 kg). The clock tower looks spectacular at night when the four clock faces are illuminated.

Can you guess what this is? It's Big Ben.
The Houses of Parliament and Elizabeth Tower, commonly called Big Ben, are among London's most iconic landmarks and must-see London attractions. Technically, Big Ben is the name given to the massive bell inside the clock tower.

Big Ben's bell weights about 12 tons. True or False?
Big Ben weighs more than thirteen tons (13,760 kg). The clock tower looks spectacular at night when the four clock faces are illuminated. The answer is False.

Figure 1. Text-based and Q&A formatted travel information conditions

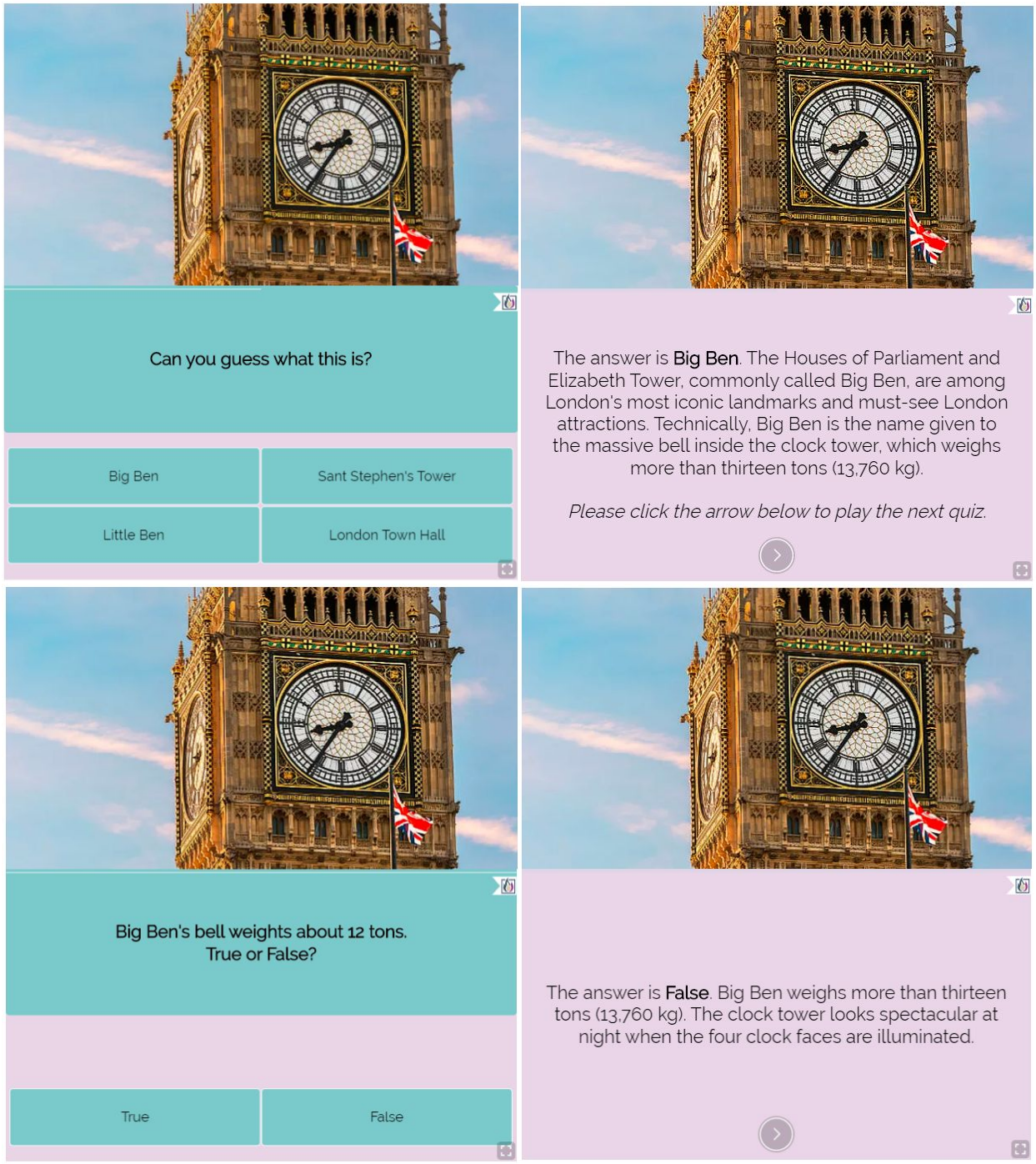

Figure 2. The gamified travel information

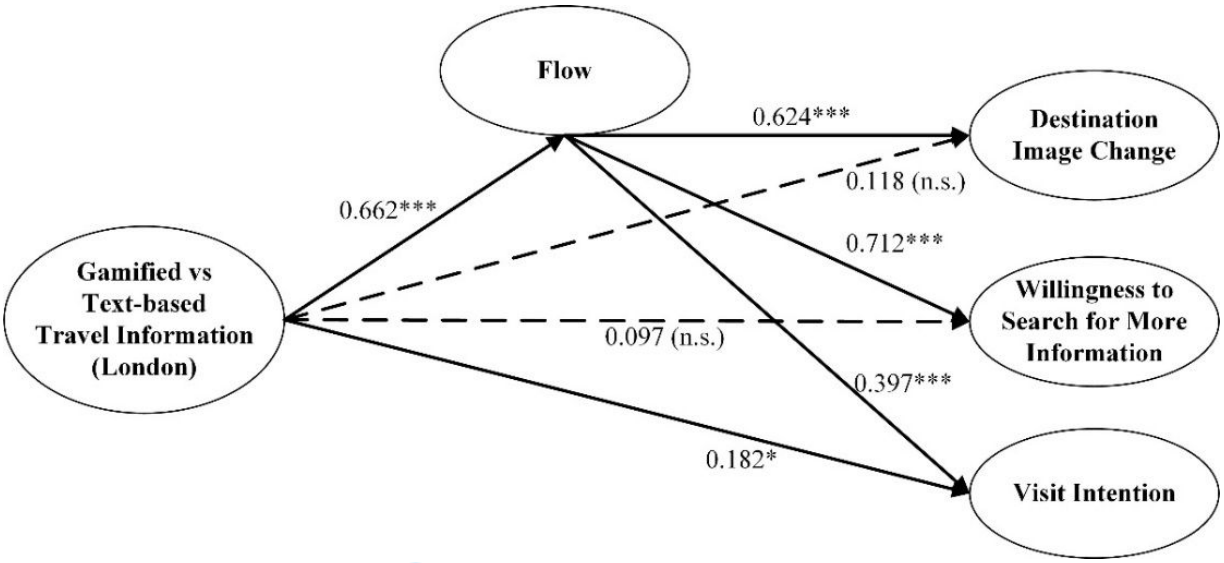

Figure 3. Flow as a mediator on the effect of gamified versus text-based information for London

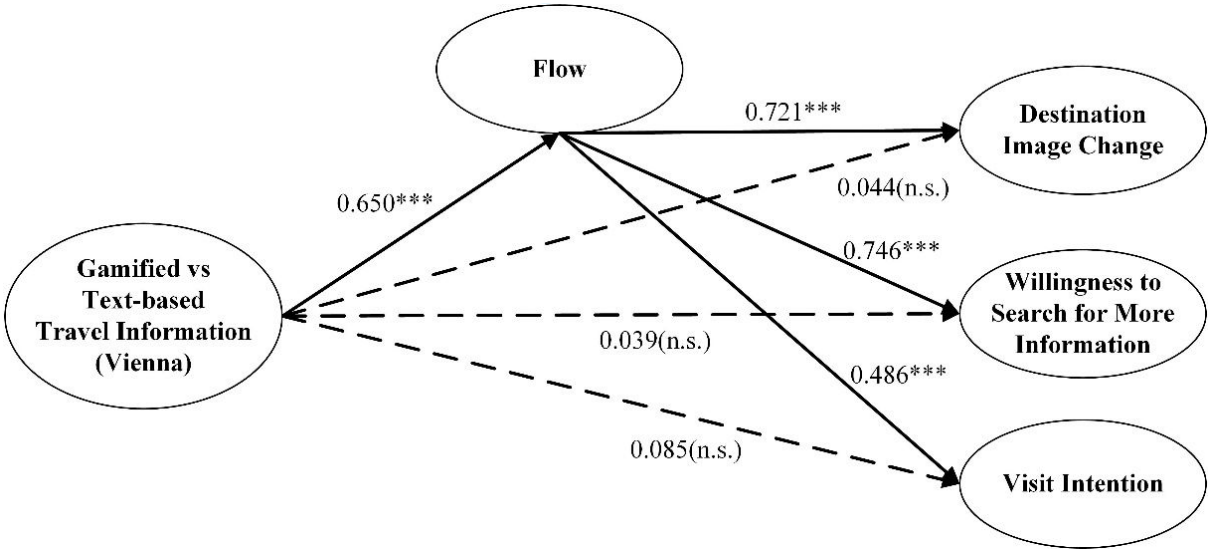

Figure 4. Flow as a mediator on the effect of gamified versus text-based information for Vienna

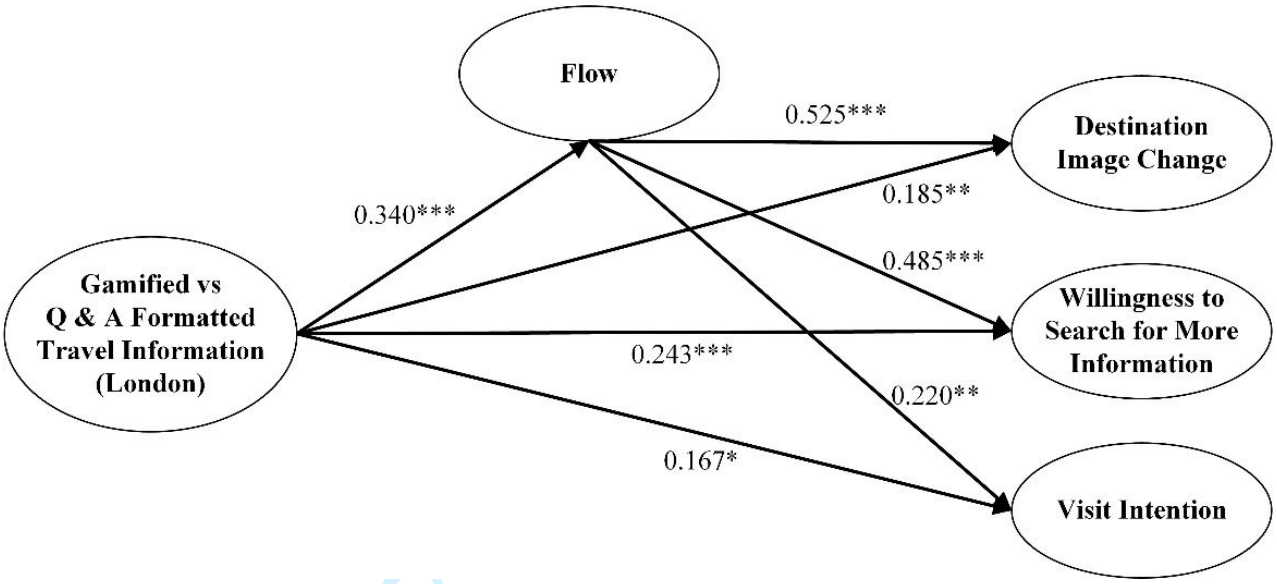

Figure 5. Flow as a mediator on the effect of gamified versus Q&A formatted travel information for London

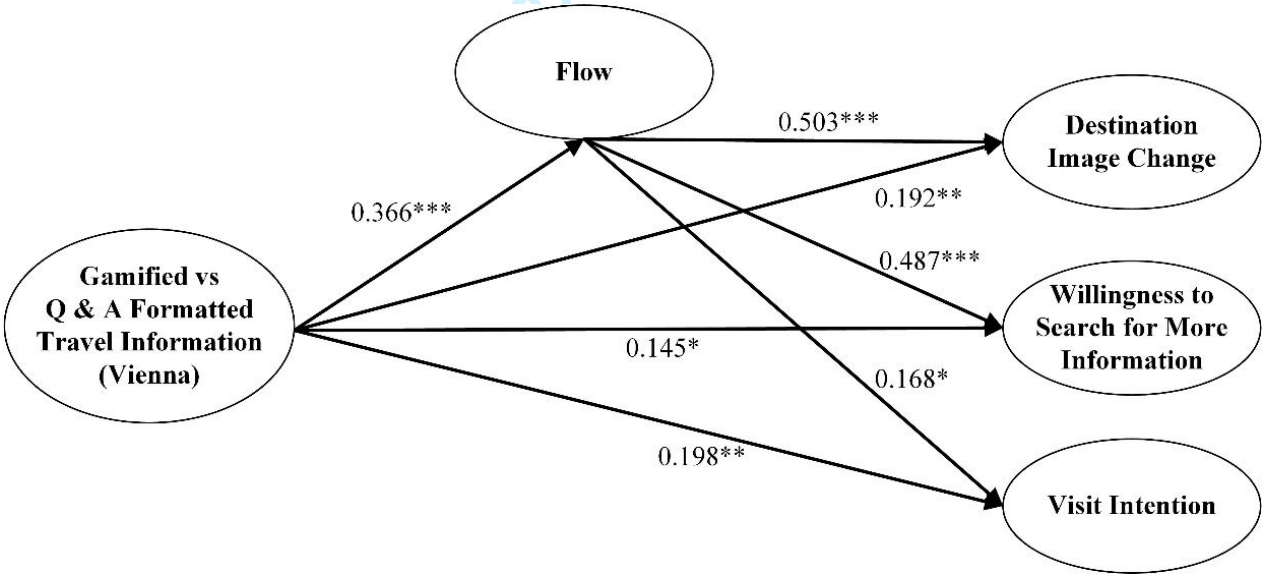

Figure 6. Flow as a mediator on the effect of gamified versus Q&A formatted travel information for Vienna