INVESTIGATING RESEARCHES ON PRE-DECISION-MAKING IN SUSTAINABLE TOURISM: A META-ANALYTIC STRUCTURAL EQUATION MODELING ASSESSMENT

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Abstract

This study used meta-analytic structural equation modeling, which involved the collection of quantitative data with qualitative software and the performance of quantitative analysis, to investigate pre-decision-making in the field of sustainable tourism research, specifically the constructs of MOA knowledge exchange, involvement, and word-of-mouth (WOM), as well as to examine the relevant literature. Two-step correlation analysis revealed that opportunity and WOM had direct and positive impacts on involvement, whereas involvement was significantly correlated with WOM, contrasting with the evidence on motivation and involvement, which indicates less significance in this research. The present findings serve as a reference for the reexamination of consumers' pre-decision-making behavior in sustainable tourism.

Keywords: Involvement; knowledge sharing; MASEM; MOA; pre-decision-making; sustainable tourism; word-of-mouth.

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調查永續觀光決策前相關研究：運用統合分析結構方程模型進行評估

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摘要

本研究經統合分析回顧了 SEM 相同徑路的相關永續觀光發表文獻，結果指出各篇永續觀光文獻中參與度到口碑的徑路並非達到一致，該徑路無顯著相關。本研究結果可重新檢視永續旅遊領域消費者的決策前行為理論提供修正參考。

關鍵字：參與理論、知識分享、結構方程統合分析(MASEM)、MOA 理論、預先決策、永續觀光、口碑行為。

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1. Pre-Decision-Making and Hypothesis Development

Sustainable tourism involves addressing the needs of stakeholders on the basis of the continued development of tourism under economic, social, and environmental impacts (Waligo et al., 2013). Given the numerous problems present in tourism development, policymakers should educate all stakeholders on the necessity of sustainable tourism (Dodds, 2012). In general, the tourism industry can support local economic activities to advance both public and private interests, but at costs to the environment (Buckley, 2011). Therefore, some researchers have recommended that the tourism industry should not be allowed to dominate the regional economic base (Sharpley, 2009). Tourism managers should forecast and plan for sustainable tourism development by educating the general public and relevant businesses, as well as forestall problems (Angelevska-Najdeska et al., 2012).

Travel driven by altruistic motives, one of the various forms of sustainable tourism, is more sustainable than conventional tourism and involves more ideologically diverse development (Xi & Cheng, 2010). The ideal of sustainable tourism is based on positive contributions to the social, natural, and economic environments of tourist destinations. According to Kasimu et al. (2012), sustainable tourism is mainly practiced in three fields: (1) energy management, (2) waste management, and (3) water management. However, Niedziółka (2012) argued that problems concerning sustainable tourism have become increasingly diversified and have gone beyond the scope of those constructs. In recent years, relevant research has addressed involvement in sustainable tourism from the perspective of motivation, opportunity, and ability. Furthermore, word-of-mouth (WOM) and reviews concerning sustainable tourism have been examined.

In research on tourism, pre-decision-making is often presented in reference to the sharing economy in the tourism industry and the accommodations sector. Tourism and accommodation services typically constitute the link between consumers' reduction of financial expenses and their "craving for network practice and social connection" (Anugrah & Hermawan, 2019). This desire for informational exchange in social research

has been thoroughly refined through the study of consumer behavior, leading to the establishment of a model on knowledge exchange. Under the motivation–opportunity–ability (MOA) framework proposed by MacInnis and Jaworski (1989) in the context of processing consumer information exchange, motivation, opportunity, and ability comprise three constructs of information exchange that are prerequisites for the investigation of consumer behavior with regard to the exchange of information on products or services. The commonality between most studies using the MOA model is that all the participants engage in information processing or decision-making processes (Hung & Petrick, 2011). The purpose of knowledge or information exchange in sustainable tourism is to draw consumers' attention to relevant products. This may be accomplished through the provision of economic, ecological, social, and cultural information to potential target consumer groups on how sustainable tourism products can satisfy their needs. The MOA framework offers considerable benefits to analysis in sustainable tourism research (Tölkes, 2018).

In sustainable tourism, motivation is multidimensional, emphasizing the composite nature of tourism (Cheng et al., 2020). Travel fueled by motivation essentially constitutes a form of escape driven by the ego ideal; the pressures of daily life can induce people to become independent and to seek adventure and new experiences through travel (Knollenberg, 2014). Furthermore, encountering the unknown in this type of travel is often considered a key catalyst for self-discovery (Ritchie et al., 2010).

The discussion of motivation in sustainable tourism has numerous dimensions. Some researchers have provided deeper insights into the controversies surrounding sustainable development in various cultures through personal experiences of the new and unique. In sustainable tourism studies addressing the humanistic, interactions with local communities or residents to establish new friendships are emphasized (Nok et al., 2017). Regarding the topic of self-growth, sustainable tourism represents the once-in-a-lifetime opportunity for an individual to establish change. As stated by Budeanu et al. (Budeanu et al., 2016), in this context, travel motivations represent the desire to be challenged, to

accomplish a major task, or to promote self-growth. In studies on the value of tourism, sustainable tourism is presented as being focused on the reassessment of personal value, the enhancement of one's self-image, and the acquisition of social recognition (Cavagnaro et al., 2018). In studies on natural environments, sustainable tourism motivations concern the enjoyment of and efforts to protect natural environments (Saarinen, 2018). Thus, the following hypothesis on sustainable tourism motivations is posited.

Hypothesis 1: Regarding pre-decision-making researches in sustainable tourism, motivation exerts positive, affirmative impacts on involvement.

In knowledge exchange, opportunity is defined as the extent to which consumers, according to their intentions, can freely receive or process information (Jepson et al., 2013). When a consumer wishes to make a purchase but their environment cannot provide the required information and knowledge, that means that the opportunity for the transaction may be insufficient (Gruen et al., 2005). Conversely, when consumers are in an information- and knowledge-rich environment, the opportunity to make transactions may increase substantially. With advances in information technology, consumers today are in environments that are full of knowledge and opportunity. However, excessive information does not necessarily correspond to increases in the proportion of successful future transactions (Budeanu, 2007).

In sustainable tourism, opportunities are situations in which knowledge is beneficial to the participant's involvement in the process, and the appearance of opportunity represents the increased degree of participation or involvement (Bahaire & Elliot-White, 1999). Possibilities may vary depending on the participation situations; when opportunity providers have more methods of investing in the knowledge pipeline, opportunity recipients are more likely to gain a deeper understanding of the value and feasibility of sustainable tourism (Lordkipanidze et al., 2005). In the corporate context, opportunity provides the firm with feedback on the recipient's information search; thus, it is regarded as firms' ability to learn. In other words, opportunity allows the organization to gain

knowledge and provide and re-exchange information at the same time (Ruhanen et al., 2012). Therefore, the following hypothesis on sustainable tourism opportunities is advanced.

Hypothesis 2: Regarding pre-decision-making researches in sustainable tourism, opportunity produces positive, affirmative impacts on involvement.

Ability refers to the skill of a participant in understanding their proficiency in solving a problem—that is, the implementation effect produced by the participant's action in knowledge exchange (Leung & Bai, 2013). Sometimes, the participants' involvement in the transaction itself may not produce the desired effects; therefore, to complete the transaction, improving the participant's ability is a goal transaction providers must attain (Binney et al., 2006). When participants' learning and acquisition of knowledge on the transaction process is encouraged, feedback from the participant can be obtained as a result of their increased ability, enhancing the attractiveness of the transaction. In sustainable tourism, ability is viewed as the sustainability of the knowledge and skills that parties in a transaction should have (Li et al., 2019). Ability is an individual's display of their judgment and self-confidence in decision-making. In other words, ability is converted into knowledge, skill, or resources from individual transactions (Cooper, 2018). Therefore, the following hypothesis on sustainable tourism ability was formulated:

Hypothesis 3: Regarding pre-decision-making researches in sustainable tourism, ability exerts positive, affirmative impacts on WOM.

The degree of customer involvement can be defined as the intention to make a purchase or a selection attributable to the customer's level of interest in a certain object or brand (Palmer et al., 2013). Studies on customer involvement discuss two stages: product involvement and purchase decision involvement (Ledikwe et al., 2020). According to Smith (Smith, 1994), product involvement refers to satisfying the customer's interest in the product, with the category of products meeting specific values and goals of the consumer. Purchase decision involvement focuses on determining the customer's interest in brand selection. A customer's involvement intention reflects their

accumulated interest in the selection process, and the extent of the involvement may concern the pre- or post-purchase decisions (Cheung & Lee, 2009).

Involvement is considered a necessary condition to support the development of sustainable tourism; it serves to maintain a relationship between tourists and local development needs. Cole (2007) argued that the development of sustainable tourism, with appropriate involvement, can raise the attractiveness of the tourist destination in the long term; this may increase tourists' awareness of and interest in local and regional issues. Numerous factors restrict involvement in sustainable tourism, including consumers' possible lack of time, interest, and knowledge (Kasimu et al., 2012). Furthermore, the lack of funds, skills, knowledge, and resources can all constrain consumers' ability to be involved in sustainable tourism (Hardy et al., 2002).

WOM should be considered the result of commenting on the success or failure of a company's product or services in multiple public and private sectors. It constitutes a mechanism by which the form or power of communication is transferred from companies to consumers (Fazal e Hasan et al., 2017). WOM intention can be defined as a customer's wish to review a company's product, brand, or services through positive or negative descriptions that are then transmitted to others through informal exchange or conversations. WOM is a crucial concept within sustainable tourism. In studies on consumer behavior, sustainable tourism is typically used to verify the connection between customer satisfaction and WOM. When tourists are satisfied with products or services at a destination they have visited, WOM generates positive effects on consumers around them (Fan & Miao, 2012). In short, service quality should be developed in sustainable tourism because it can raise tourist satisfaction, and this type of satisfaction can be marketed and promoted through more effective tourism WOM (Reyes-Menendez et al., 2019).

According to Svein et al. (Larsen & Wolff, 2019), trends in or topics on recent research on WOM in tourism, namely revisit intention, satisfaction surveys, destination brand image, perceived serve quality, and consumer behavioral intentions. However, fewer

efforts have been devoted to investigating the role of sustainable tourism (Buffa, 2015). Nevertheless, problems in sustainable tourism have undergone various developments in subsequent studies (Waldron & William, 2002). Thus, the following hypothesis on WOM in sustainable tourism is postulated:

Hypothesis 4: Regarding pre-decision-making researches in sustainable tourism, involvement exerts positive, affirmative impacts on WOM.

2. Frontiers of Meta-Analytic Structural Equation Modeling

Meta-Analytic Structural Equation Modeling (MASEM) was developed in the United States in the mid-1990s. According to Viswesvaran and Ones (1995), one of its strengths is that researchers do not need to include all the relevant variables or constructs within a theory in a single study. In fact, researchers can design their own research variables or constructs, as well as use previous research data and results to validate relationships between them. Using structural equation modeling (SEM) can help researchers save a considerable amount of time by reusing research results; therefore, apart from contributing critically to validation in social sciences research, it can also be used to perform long-term testing and analysis for studies that examine large amounts of data (Huang & Lin, 2007).

In general, MASEM has two steps. In the first step, all correlation matrices used are synthesized across studies. The second step involves SEM, which can be used to analyze and summarize the content of the correlation matrices. Hedges and Olkin (1985) proposed various univariate and multivariate methods for synthesizing the correlations in the first step of cross-matrix studies. The researchers indicated that coefficients in the correlation matrix are typically regarded as independent in the univariate meta-analysis, and the correlations among them are typically temporarily excluded from the calculations. In their development of univariate methods, Hunter and Schmidt (2004) applied meta-analysis to each element of the correlation matrix and then incorporated the resulting correlation coefficient into a merged correlation matrix. Cheung and Chan (2005) developed a two-

stage SEM technique for data extraction and analysis technique. In the first stage, the homogeneity of the correlation matrix, as well as the estimations of the merged correlation matrix and its asymptotic covariance matrix, are tested. In the second stage, the merged correlation matrix and its asymptotic covariance matrix are analyzed and used as the weight matrix in asymptotically distribution-free methods in the structural equation, which is then used as the estimation method for analysis.

The sole performance of meta-analysis has numerous limitations. As Bergh et al. (2016) stated, meta-analysis does not allow for advanced data analysis and evaluation and cannot compare models involving competing modes of inference or multiple permutations of predictors. Meta-analysis can only detect the direction and significance of bivariate relationships (Carney et al., 2011). The sole performance of SEM analysis in research also has its shortcomings. Hair et al. (2011) argued that SEM has difficulty pinpointing the quality of studies' questionnaire designs, determining whether a questionnaire survey process is random, verifying the true intentions of survey respondents or the quality of their responses, and calculating the true sample range of study topics. Studies may fail in the event that the optimal index cannot be determined from the results.

MASEM is recommended for use in analyzing past research when cross-disciplinary or cross-perspective verification is necessary. Its integration of meta-analysis and SEM may overcome some of the challenges concerning the verification of merged studies or collaboration from different fields. MASEM uses qualitative methods for data collection to analyze similar studies and then converts the results into standardized data. Subsequently, the structural equation test of the study correlations is performed through the weighted integration of the data samples. In short, this method is suited for inductive research, whether field specific or cross disciplinary.

Studies that conduct MASEM also have numerous limitations, the first of which is that it is not recommended for use in research constructs with disputed relationships. Multiple appearances of such constructs lead to the inability to obtain reliable valid, or

indicative results from the meta-analysis. Thus, to avoid false-negative conclusions, this type of topic should first be excluded when establishing the research question. This can also prevent the inclusion of unevaluable results in the discussion, which would result in research bias.

The second limitation of MASEM is its inability to accurately obtain indicative results from past research paper when research data cannot be easily researched. This is because primary data are difficult to obtain, thus restricting the amount of data usable for statistical analysis. Furthermore, MASEM cannot be performed when the research topic is too new, because the insufficient body of evidence may result in research bias.

The third limitation of MASEM is it cannot be used for data analysis verification when the indicators in the data have poor validity. Similar to qualitative research methods, MASEM is based on multiple past studies and their data; however, it uses statistical methods determine the validity of the relationships between certain constructs. If the indicators of the research results have poor validity, the reliability and validity of the MASEM results will also be affected.

In sum, the qualitative data obtained through meta-analysis cannot be subjected to multivariate analysis. SEM, conducted in quantitative research after the examination of the data, lacks a reverification mechanism. MASEM complements the strengths of these two methods and can be applied to a specific field to validate relevant theories and the importance of the conceptual framework.



Figure 1. Conceptual framework of pre-decision-making.

3. Implementation of MASEM

Databases provided by Ebsco, the Emerald Insight and Science Direct databases, the Google Scholar search engine, and open access databases containing publications from journals on sustainable management (e.g., *Sustainability*) were searched for quantitative data involving statistical techniques related to SEM or partial least regression that have matured over the past 20 years. The keywords used in the cross-search between the research topics and the qualitative studies were “sustainability,” “sustainable tourism,” “MOA,” “AMO” (another name for MOA), “knowledge exchange,” “involvement,” “engagement,” “commitment,” “participation,” and “WOM.”

The retrieval of keywords related to knowledge exchange with regard to the MOA framework revealed that most such theories were used in human resources or education research. Relatively less evidence on the direct use of knowledge exchange theories in sustainable tourism was found, and a considerable number of restrictions on the use of SEM for quantitative analysis was observed. The strength of this type of search is that the resulting themes are very focused, and bias stemming from cross-disciplinary analysis may be reduced. The shortcoming is that the in-depth selection and analysis of the data are time consuming.

Visewsvaran and Ones (1995) presented the following steps for using MASEM for theoretical verification. Regarding the configuration of the measurement model, the correlations between key constructs are confirmed in step 1. In step 2, the different methods by which the study constructs are measured should also be confirmed. Step 3 involves the acquisition of data on the correlations between individual domain measurements. In step 4, the basic data and information necessary for domain measurement are collected. Step 5 is the meta-analysis, and the heterogeneity or homogeneity between these measurements is evaluated. In step 6, these measurement models are tested through reliability and validity analyses. Regarding the performance of model analysis on the correlations, step 7 involves the estimations of the correlations between the configured model constructs, and step 8 involves the use of path analysis to

estimate the domain relationships and test the proposed theories. In step 9, the future trends are analyzed.

Table 1. List of selected articles for the assessment of the meta-analytic framework.

Category	Features	Contextual background	Representative Authors	Published Periodicals
MOA	Antecedent	Travel agents' performance	Elbaz et al. (2017)	Journal of Knowledge Management
MOA	Antecedent	Communities of virtual co-creation	Bettiga et al. (2018)	International Journal of Consumer Studies
MOA	Antecedent	Engagement in organic farming	Zhu & Habisch (2020)	British Food Journal
MOA	Antecedent	Corporate sustainability on ethical climates	Guerci et al. (2015)	Journal of Business Ethics
Motivation	Antecedent	Sustainable consumption	Khan & Hameed (2019)	Amazonia Investiga
Motivation	Antecedent	Sustainable work behavior	Yi et al. (2019)	Sustainability
Opportunity	Antecedent	Implementation of industry 4.0 and sustainability	Müller et al. (2018)	Sustainability
Involvement / WOM	Mediator & Outcome	Social Identity, inward tourism	Palmer et al. (2013)	Tourism Management
Involvement / WOM	Mediator & Outcome	Word-of-mouth for online retailers	Anastasiei & Dospinescu (2019)	Sustainability
Involvement / WOM	Mediator & Outcome	Residents' behavior and support for tourism	Blasco López et al. (2020)	Administrative Sciences
Involvement / WOM	Mediator & Outcome	e-WOM on hotels management reputation	Reyes-Menendez et al. (2019)	IEEE Access

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Involvement / WOM	Mediator & Outcome	Sustainability of a virtual community	Cheung & Lee (2009)	Journal of Information Science
MOA	Antecedent	Revisit intention	Leung & Bai (2013)	Journal of Travel & Tourism Marketing
Motivation / Involvement	Antecedent	Wine consumption	Taylor et al. (2018)	International Journal of Contemporary Hospitality Management
Opportunity / Involvement	Antecedent	Knowledge sharing in green supply chains	Cheng et al. (2008)	Supply Chain Management
MOA	Antecedent	C to C online know-how exchange	Briliana et al. (2015)	Advanced Science Letters
MOA	Antecedent	Value creation and loyalty	Gruen et al. (2007)	Journal of the Academy of Marketing Science
MOA	Antecedent	eWOM impact	Gruen et al. (2006)	Journal of Business Research
MOA	Antecedent	Knowledge sharing and tourist behavior intention	Wu et al. (2011)	Southwest Decision Sciences Institute
WOM	Outcome	WOM in social network	Camoiras & Varela (2020)	Revista Galega de Economia
MOA	Antecedent	Knowledge sharing in healthcare	Radaelli et al. (2014)	Creativity and Innovation Management
Motivation	Antecedent	Motivation on customer participation	Sukoco & Wu (2010)	African Journal of Business Management

4. Application of Meta-Analysis

In accordance with the conceptual framework, 5 constructs and 10 pathways were analyzed and tested in the present study. In the meta-analysis, Microsoft Excel, IBM SPSS Statistics for Windows, version 22 (IBM Corp., Armonk, NY, USA) and Comprehensive Meta-Analysis version 2 software were used in the calculations and conversions of the qualitative data. Table 2 presents the results of the heterogeneity analysis and test of publication bias. The Q and I^2 statistics are indicators of heterogeneity. The Q value, which determines the degree of heterogeneity, typically follows a chi-square distribution. Before calculating the Q, the null hypothesis—that each study will have the same results (i.e., homogeneity)—must be posited. Under this hypothesis, the Q value approaches 0, and the closer it is to 0, the lower the heterogeneity of the sample. Conversely, the farther it is from 0, the greater the sample heterogeneity (Higgins et al., 2019). Describing the extent of heterogeneity-induced variation across studies, the I^2 statistic falls between 0% and 100%. The second edition of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins et al., 2019) divides the I^2 into intervals of 25%, with 25% and lower indicating low heterogeneity and 75% and higher indicating high heterogeneity. In other words, higher I^2 values indicate greater heterogeneity in the overall sample. In biomedical research, when I^2 values exceed 50%, biomedical examinations of causal relationships between patients cannot be continued (Higgins et al., 2019). In social research, an I^2 that is greater than 50% is indicative of heterogeneity that is too substantial to allow the identification of causal relationships; however, the cause of heterogeneity among the research topics is observable.

Rosenthal's fail-safe N is the primary indicator for in tests of publication bias in meta-analyses. According to Rosenthal (1979), Z values greater than 100 indicate publication bias, whereas Z values smaller than 100 require calculations and comparisons with the use of the equation $19s - n >$ tolerance, where s and n represent articles with and without significance, respectively. The fail-safe N is the number of additional studies with intervention effects of zero (i.e., "negative" studies) that would be required to increase

the meta-analytic *P* value to over 0.05.

All the P values in the present study were significant (i.e., less than 0.1 as opposed to 0.05), indicating a significant amount of heterogeneity in the data. Each pathway revealed Q values greater than 0; in other words, H_0, the null hypothesis was rejected, whereas H_1, the alternative hypothesis, was accepted. Specifically, H_1 rejected all nonsignificant differences in the data, indicating high heterogeneity among the research topics. In each path, the I^2 was 90% or greater. The path between opportunity and involvement exhibited the highest heterogeneity, whereas that between involvement and WOM demonstrated the lowest heterogeneity.

Table 2. Heterogeneity test of the meta-analysis of sustainable tourism studies.

Path	*p*	*Heterogeneity*		*Fail-Safe N*
		Q (df)	*I^2 (%)*	
ABI-MOT	0.000	191.546(6)	96.868	1620
ABI-OPPO	0.000	721.11(6)	99.168	7069
ABI-WOM	0.000	319.868(6)	98.124	1962
INVOL-ABI	0.000	215.785(7)	96.756	3928
INVOL-MOT	0.000	393.26(12)	96.949	7306
INVOL-OPPO	0.000	1574.375(11)	99.301	7814
INVOL-WOM	0.000	87.698(6)	93.158	478
MOT-WOM	0.000	254.787(5)	98.038	1825
OPPO-MOT	0.000	742.951(6)	99.192	872

The fixed-effects and random-effects models are used to examine the merging of different studies in a meta-analysis. The fixed-effects model involves the comparison of the differences between specific items or categories of each independent variable, as well as the effects of their interaction with the specific items or categories of other independent variables. No inferences can be made regarding the research design of other categories not corresponding to the same independent variable. The model assumes that all articles have the same true effects. This is not the case in most meta-analyses, because homogeneity or a close thematic correlation between the individual articles is difficult to

maintain; therefore, studies conducting literary analysis mostly use random-effects models, in which the topic is subjected to in-depth analysis by using changes or differences in true effects on the basis of different fields, themes, or scopes of research. In random-effects models, the true effect size is determined by not only the sampling error but also the effects of multiple external factors on each article. The true effects incorporate the analytical results into a model that conforms to the normal distribution.

Guolo and Varin (2017) argued that an extensive body of literature cannot be easily collected when topics that typically interest researchers remain in the research development stage. Five and three are the minimum number of articles that should be collected for and included in a meta-analysis. When heterogeneity is present among the articles, to meet the assumption of a large, normally distributed sample, a random-effects model should be used to combine the results (DerSimonian et al., 2007). The second edition of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins et al., 2019) also suggests using a fixed-effects model in assessment when the heterogeneity is less than 40%. The use of random-effects model requires a larger sample size; if the sample size is small, the fixed-effects model should be used instead.

The *P* values and Z values in Table 3 are from significance tests. To conclude that collected data are normally distributed, Z values must be greater than 1.96. All of the Z values in the present study fulfilled this requirement. If the difference between the upper and lower bounds of the 95% confidence interval can be less than 0.25, the mutual information of the articles will typically be considered accurate. In general, a difference that is greater than 0.5 may indicate insufficient accuracy, but this depends on the topic and field of research. The difference between the upper and lower bounds of the 10 paths in this study were all less than 0.25 in the fixed-effects model and less than 0.5 in the random-effects model; only the opportunity–WOM path had a slightly greater difference at 0.565. Overall, sample accuracy was favorable. Furthermore, a comparison of the values of the fixed effects and random effects of each indicator revealed that because of the characteristics of the diverse development of the sustainable tourism and because of

the collected data were presented as small samples, and consequently, the fixed-effects values were better than the random-effects values.

Table 3. Fixed and random effects in the meta-analysis.

Path	*Effect*	*S.E.*	*P.E.*	*95% CI*		*Test of Significance (2-Tail)*	
				LL	*UL*	*Path*	*Effect*
ABI-MOT	Fixed	0.007	0.736	0.728	0.743	109.206	0.000
	Random	0.050	0.680	0.611	0.739	13.659	
ABI-OPPO	Fixed	0.007	0.702	0.694	0.711	101.163	0.000
	Random	0.108	0.395	0.191	0.566	3.650	
ABI-WOM	Fixed	0.019	0.649	0.623	0.674	34.658	0.000
	Random	0.143	0.621	0.379	0.783	4.352	
INVOL-ABI	Fixed	0.008	0.426	0.412	0.440	53.294	0.000
	Random	0.054	0.479	0.385	0.563	8.847	
INVOL-MOT	Fixed	0.008	0.417	0.404	0.430	55.424	0.000
	Random	0.050	0.467	0.381	0.546	9.380	
INVOL-OPPO	Fixed	0.007	0.454	0.442	0.466	62.366	0.000
	Random	0.101	0.408	0.220	0.567	4.055	
INVOL-WOM	Fixed	0.022	0.346	0.307	0.384	16.088	0.000
	Random	0.082	0.356	0.201	0.494	4.330	
MOT-WOM	Fixed	0.019	0.700	0.675	0.723	36.395	0.000
	Random	0.145	0.671	0.436	0.820	4.626	
OPPO-MOT	Fixed	0.006	0.772	0.765	0.779	119.024	0.000
	Random	0.104	0.535	0.354	0.678	5.147	
OPPO-WOM	Fixed	0.020	0.503	0.470	0.535	24.805	0.004
	Random	0.180	0.519	0.182	0.747	2.880	

The number of articles in each path in the models, as well as the sample size and the correlation coefficients, as presented in Table 4. Four paths had significantly high correlations ($P < 0.001$), as indicated by correlation coefficients of 0.7 or higher: ability to opportunity, ability to motivation, opportunity to motivation, and WOM to motivation. Two paths had correlation coefficients of 0.5 or higher and significantly moderate correlations ($P < 0.001$): WOM to ability and WOM to opportunity. The remaining paths

had correlation coefficients of 0.3 or higher (P < 0.001). The path with the largest number of samples (K) and articles (N; 13 and 15,469, respectively) was the motivation to involvement pathway. The motivation to WOM path had the smallest number of samples and articles of 6 and 1779, respectively.

Table 4. Correlation matrix constructed from the selected articles.

Construct	1	2	3	4	5
1.WOM		2010 (7)	2027 (7)	2027 (7)	1779 (6)
2.INVOL	.346***		13727 (8)	16253 (12)	15649 (13)
3.ABI	.649***	.426***		13479 (7)	13479 (7)
4.OPPO	.503***	.454***	.702***		13479 (7)
5.MOT	.700***	.417***	.736***	.772***	

The correlation coefficients (r) and significance (***P < 0.001) are under the diagonal between each path. The number of samples (N) between each path and the number of valid articles (K) used in each path in the parentheses are above the diagonal.

5. Application of structural equation modeling

To verify the model hypotheses, On the basis of the correlation matrix established from the meta-analysis, AMOS Graphics 20 was used in the calculation and analysis of the model data on pre-decision-making from the sustainable tourism literature. Considering that the study indicators showed high heterogeneity, the domain correlation coefficients can be inferred to have poor convergence; thus, the indicators between the constructs could not be tested. If the indicators had shown homogeneity, various indicators of correlations (e.g., comparative fit index, goodness-of-fit index, and the root mean square error of approximation) between the constructs would have been tested and would have revealed meaningful information. Therefore, the SEM in the present study was centered on hypothesis testing.

According to the data analyzed in Table 5, for a hypothesis to be supported, in addition to P values attaining significance (i.e., P < 0.05), t values must be greater than the absolute value of 1.96. The results from the statistical analysis indicate that motivation did not

significantly positively affect knowledge involvement (r = 0.048, P = 0.393, t = 0.854); thus, hypothesis 1 is not supported. Opportunity significantly positively affected involvement (r = 0.321, P < 0.001, t = 6.694); thus, hypothesis 2 is supported. Ability exerted significantly positive effects on knowledge involvement; thus, hypothesis 3 is supported (r = 0.237, P < 0.001, t = 6.421). Knowledge involvement also exerted significantly positive effects on WOM; thus, hypothesis 4 is supported (r = 0.473, p < 0.001, t = 28.004).

Table 5. Hypothesis testing.

Hypothesis	Hypothesised Relationship			Path Coefficient	*p*-value	t-value	Conclusion
H1	Motivation	→	Involvement	.048	< .393	.854	Not Supported
H2	Opportunity	→	Involvement	.321	< .001***	6.694	Supported
H3	Ability	→	Involvement	.237	< .001***	6.421	Supported
H4	Involvement	→	WOM	.473	< .001***	28.004	Supported

****p*-value < .001, **p-value < .01, **p*-value < .05

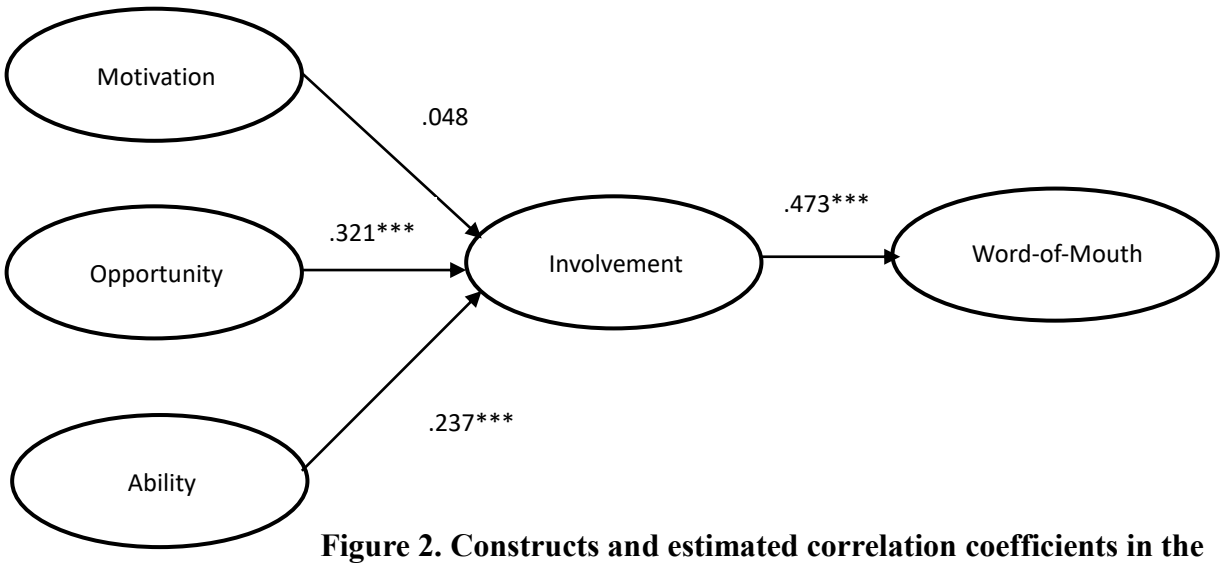


Figure 2. Constructs and estimated correlation coefficients in the structural equation modeling process.

6. Discussion and Conclusion

6.1 Methodological Implications

On the basis of the indicators in the meta-analysis, sustainable tourism problems were analyzed using the constructs of knowledge exchange presented in the MOA framework. High data heterogeneity was observed. SEM indicated relatively consistent results with regard to the significance of the data among hypotheses on various problems; also, the hypotheses appear to have received positive support. However, most of the coefficients of the SEM indicators failed to meet the minimum threshold of the statistical test. The most likely problem was the high degree of heterogeneity in the literature; despite the statistical significance of the data, convergence was not possible. In other words, the problem with past studies on the MOA framework with regard to problems in sustainable tourism is not the topical diversity (which is high) but rather the fact that the body of literature on the same topic is lacking. The statistical analysis indicated that the topic of knowledge exchange in pre-decision-making has a sufficient amount of potential and possibility in future developmental research on sustainable tourism.

The main shortcoming of MASEM is that it is built on the examination of quantitative research; nonquantitative data cannot be converted in MASEM. Some articles that were accepted at the beginning of the study were later excluded because sufficient data could not be provided; this may have biased the sustainable tourism analysis. Furthermore, some qualitative studies were excluded through an intensive process in the initial sampling. Therefore, researchers undertaking similar analyses are advised to differentiate and categorize publications according to differences in qualitative and quantitative research. However, the statistical process and analysis described earlier demonstrated that MASEM effectively identified consistency or representativeness in data across multiple articles on related topics; it is the optimal approach for this purpose.

6.2 Implications Regarding Research Topics

The present findings indicate the relative paucity of research on the use of the MOA framework in sustainable tourism. The statistical analysis revealed that the overall definition of sustainable tourism varies widely by research topics. This is a double-edged sword; although the thematic diversity of sustainable tourism is positive, the lack of focus in this area of research may not be. Thus, the only approach through which to transform issues on sustainable tourism into meaningful literature is to promote the accumulation and in-depth development of diverse research topics on sustainable tourism. This is expected to highlight problems in sustainable tourism, as well as the relevance of findings from studies on this topic.

As mentioned, the statistical data did not support hypothesis 1, possible reasons for which are presented as follows. First, an insufficient number articles on the topic or in the specific research format (i.e., quantitative studies on sustainable tourism that provide correlation data) was collected. Second, the perspectives on motivation to involvement may be inconsistent and overly varied. Third, the research topics on motivation to involvement may be overly divergent and therefore not conducive to the establishment of a consensus (i.e., a positive or negative view). A review of the results revealed that the first perspective constitutes a point of future improvement; specifically, more evidence from related research along the hypothesis 1 path should be collected for the further analysis. The second perspective cannot be avoided in topics on sustainable tourism and requires detailed statistical examination. The third perspective is similar to the second perspective, and numerous articles will contain positions and hypotheses that vary because of differences in research directions. The lack of support for the motivation to involvement path in hypothesis 1 indicates that the current research paths in sustainable tourism are more complex than other hypothetical pathways in the present study. The articles along the paths will be further analyzed in future investigations.

The pre-decision-making framework itself is used in research on consumer behavior or human resource management, in which knowledge exchange theories (e.g., the MOA

framework) are appropriate. However, high heterogeneity arises when the pre-decision-making framework is applied in studies on sustainable tourism–related topics or issues. Moreover, the risk of being unable to retrieve specific quantitative studies must be taken into account. These concerns were not addressed in the initial stage of this study. Researchers should do so when designing theoretical frameworks to avoid problems such as an insufficient body of evidence on overly broad topics. The research framework was responsible for certain limitations in data collection. Nevertheless, the present study ascertained the status of various research topics on sustainable tourism, from knowledge exchange to WOM.

6.3 Contributions and Limitations

The present findings serve as a reference for testing frameworks in a specific field—specifically, for determining whether the results of multiple studies in a field of research meet the expectations of the academic community. On the basis of the pre-decision-making framework proposed in this study, the viewpoints on sustainable tourism presented in all the articles were tested for consistency. However, the proposed framework mainly focuses on discussing the organization of each path indicator and does not comprehensively examine the full framework (Kim et al., 2015). Nevertheless, the proposed framework is expected to be able to determine whether the sustainable tourism contain paths or results that are inconsistent with general expectations.

The present findings contribute to the development of future research on sustainable tourism. The reanalysis of data in studies that perform MASEM can facilitate the verification of the statistical results presented in entire bodies of past research in a certain field or topic. In other words, whether research topics are divergent or convergent can be determined through MASEM on the basis of literature data. Despite the limitations attributable to the research direction, overall, the data sampling in the present study constitutes a valid basis from which future investigations and theoretical development or verification in this field of research can be performed.

MASEM provides the analytical potential for sustainable tourism research involving the in-depth exploration of multivariate or multilevel frameworks. Beyond the conventional, relatively simple framework analysis in SEM, MASEM uses qualitative meta-analysis methods to unravel the layers of major problems in sustainable tourism research. In other words, MASEM provides a fresh perspective, allowing researchers to determine which framework relationships are essential to the literature and which should be reconsidered. In sum, MASEM research can reshape the potential of the development of the literature.

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