

Manuscript Submitted	Nov 11, 2020
Accepted	Dec 19, 2020
Published	Dec 24, 2020

## Evaluation of Tourism Information Accuracy Assessment Framework

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### Abstract

*The objective of this paper to evaluate the framework's suitability, efficiency, satisfaction, adaptability and safety for tourism information. The usability evaluation method includes the usability attributes of framework in tourism information phenomena's such as information source, information development, information gathering, information collection and information assessment. The usability evaluation has been conducted using the expert review methodology to gather for recommendations and improvements of the developed framework. The framework expert review comprises of five evaluation components which are the expert selection criteria, expert selection, issue familiarization of experts, collection of responses and result reporting. Furthermore, we also analysis the usability of the framework based on the experts score for each area for the assessments. We have used the polar chart to show the overall usability measurement of the framework and the results has been discussed. The identified usability issues been addressed accordingly to ensure the developed framework is useful for tourism information environments in producing accurate tourism information.*

**Keywords:** *Tourism Information, Information Accuracy, Information Assessments, Expert Review, Framework Usability Evaluation.*

### 1. Introduction

A best practice of information accuracy exemplifies initiative, innovation and represents a significant improvement over the information accuracy. There are many possible substances to acquire better information accuracy levels from collective information accuracy assessments, potentially in tourism business to increase the accuracy levels of the information. The information accuracy assessments are common in the information environment and hence tourism saw the needs for information accuracy assessments as a vital requirement in the dissemination of accurate information to tourism stakeholders (Antunes, Ramos, & Sousa, 2018; Antunes, Herskovic, Ochoa, & Pino, 2014; Bhat & Shah, 2014). In the information environment, the information accuracy assessment of information source and content, can help and support the organization to upscale the information needs, improve the effectiveness and quality of information and provide accurate information to stakeholders' for decision making (Saifullin & Lomovtseva, 2019; Wanagos & Studzieniecki, 2018; Xujuan, Yuefeng, Bruza, Sheng-Tang, Yue, & Lau, 2007).

## 2. Literature Review

In tourism, information is rigorous and complex. In spite of that, the tourism stakeholders requires accurate tourism information for various purpose (Fesenmaier, Xiang, Pan, & Law, 2011). Tourism information consists of statistical data, traveling details, promotion regulations standards, reports and surveys (Wanagos & Studzieniecki, 2018; Sheldon, 2016). Tourism information providers are tourism government agencies, tourism organizations, tourism associations, tourism consultants and tourism market researchers that are responsible for tourism information dissemination in tourism environment (Kourouthanassis, Mikalef, Pappas, & Kostagiolas, 2017; Tabibian, Valera, Farajtabar, Song, Schölkopf, & Gomez-Rodriguez, 2017). According to Molina, Fernández, Gómez, and Aranda (2017); Lam and McKercher (2013), the tourism information gaps such as information inaccuracy, information complexity, mass information leads to the tourism information quality issues. Laddha, Koli, and Jawandhiya (2018); Kourouthanassis *et al.* (2017); Li, Hu, Huang, and Duan (2017), has indicated that, the existing tourism information services did not have a systematic information assessment processes or mechanism for tourism information accuracy assurances.

Furthermore, the tourism information gap between information source and information retrieval mediums contribute towards poor information accuracy assurance and affects tourism stakeholders' ability to make decisions (Kourouthanassis *et al.*, 2017; Munar & Jacobsen, 2013). The information gaps found when there is discrepancy of information source and content of the disseminated information with the original information in tourism environment. According to Li *et al.* (2017); S, Derlund, and Lundin (2017), the common information gaps were found particularly in tourism complex information and information flows in various time frame. According to Kourouthanassis *et al.* (2017); Li *et al.* (2017); Moghavvemi, Ormond, Musa, Mohamed Isa, Thirumoorthi, Bin Mustapha, Kanapathy, and Chiremel Chandy (2017), the poor information practices are contributed by the none existent of good practices in ensuring the tourism institutions mainly information providers in ensuring tourism information accuracy. The similar concerns of tourism institution commitments and insufficient institutional management commitments have been raised by Mamaghani (2009); Dredge and Jenkins (2003) and Zabel (2003) as well.

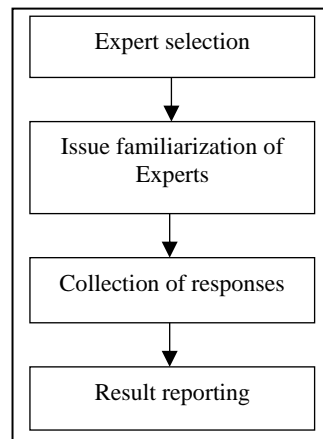
In the current digital era, information through websites, social media and tourism agencies are large and popular as well as being very regular. Finding shows that more than 70% of the search traffic through web sites and social media are utilized on information related activities (Choe & Fesenmaier, 2017; Kang & Lerman, 2017; Angskun & Angskun, 2009). According to Höpken, Ernesti, Fuchs, Kronenberg, and Lexhagen (2017), tourism industry now face a new challenge in dealing with tourism big data, which means the management of tourism information is vital to ensure the quality and accuracy of the information for decision making. Furthermore, Ramos and Rodrigues (2013), has indicated that the quality and accurate tourism information are vital for tourism stakeholders to make decisions. According to Altinay, Paraskevas, and Jang (2015), the review of the past, present and future research of information search, the decision making process starts when the tourism stakeholders seeks for information through various channels. From the tourism stakeholders' point of view, the tourism information accuracy assessment is important to reduce uncertainty, perceived risk and enhance the quality of business decisions (Kourouthanassis *et al.*, 2017; Li *et al.*, 2017).

## 3. Evaluation Method

To evaluate the framework, the evaluation method generally serves as a guidance of this evaluation process flows proposed by Ayyub (2001) (see Figure 1). The framework practices evaluation comprises five evaluation components or process flows as illustrated in Figure 1.

The framework evaluation provides an objective approach to evaluate framework by assessing and improving the developed framework. With reference to Larusdottir (2011); Shackel (2009); Riihiaho (2000), the usability evaluation in software development practice, we have identified the suitability, efficiency, satisfaction, adaptability and safety as the usability attributes areas for evaluation. The framework usability assessment form developed based on the data quality assessment common practices

(Zaveri, Rula, Maurino, Pietrobon, Lehmann, & Auer, 2015; Park, Na, & Kim, 2014; Blake & Mangiameli, 2011; Shanshan, Ip, Leung, & Law, 2010; Lazar, Dudley-Sponaule, & Greenidge, 2004).



**FIGURE 1.** Expert Review Evaluation Flow (Ayyub, 2001)

**i. Experts and Selection**

The evaluation identifies the tourism experts with knowledge and skills on tourism information development, gathering, collection and information policy matters. In total 6 experts from tourism industry were responded out of 12 contacted experts. Table 1 provides the breakdown of personals of tourism experts.

**TABLE 1.** Tourism Experts Selection

Department/Unit/Organization/ Agencies/IC	Number of Tourism Experts
Tourism Information Center (IC)	1
Tourism Malaysia	1
Malaysia Association Tour & Travel Agents (MATTA)	1
Ministry of Tourism Culture Malaysia (MoTAC)	1
Tourism Travel Agencies	2

**ii. Issue Familiarization of Experts**

To ensure the tendency of the data collection, the selected respondents were furnished with information and explanations about the needs, requirements and the review process to ensure the respondents are able to understand their roles and responsibility in evaluating the framework.

**iii. Collection of Responses**

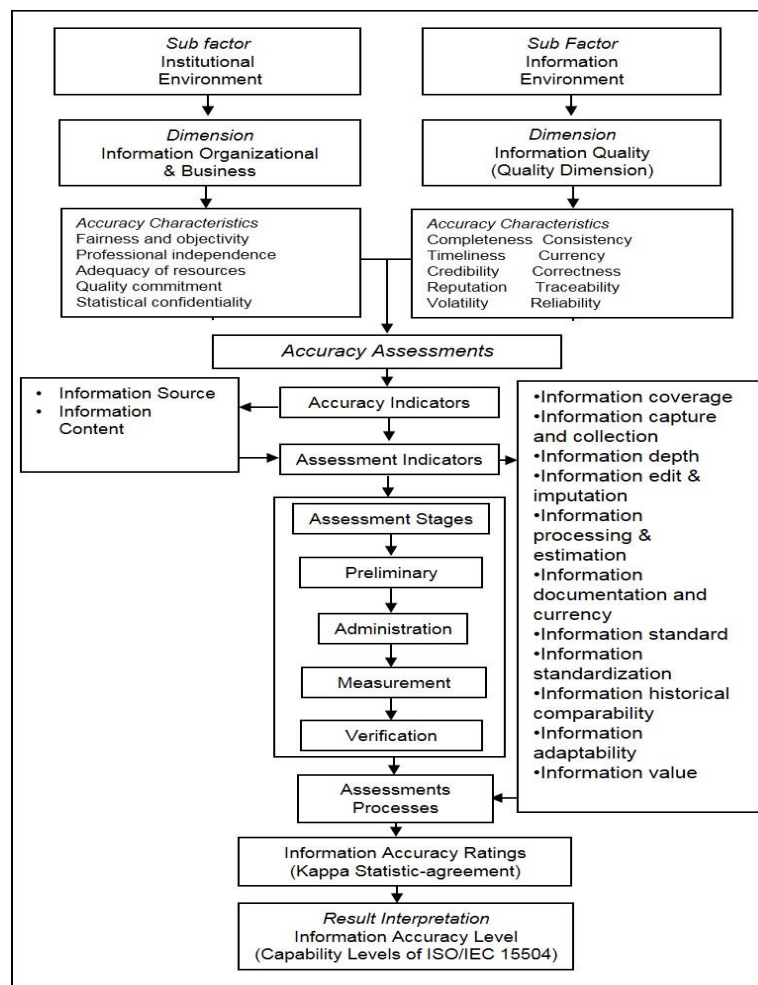
Before the data collection period, permission from the respondents' to allow the respondent's participation for the data collection exercise was obtained. The framework usability assessment form has been designed in such way allow the respondents apply this instrument easily without a need of prior technical knowledge. Upon completion of each data collection session, we have collected the responded feedbacks for analysis purpose.

**iv. Result Reporting**

The presentation of results is concentrated with the outcome of the data collection processes which are based on the comments from the tourism experts as well as the analysis of the data collected from the evaluation reports.

#### 4. Tourism Information Accuracy Assessment Framework

The framework provides a comprehensive guiding light for the tourism information providers in ensuring tourism information accuracy. In this section, we will explain the details of the framework. Figure 2, illustrates the framework. The framework consists of sub factor, dimensions characteristics, accuracy assessments and assessment ratings. With reference to the tourism information organizational & business and data quality dimensions accuracy characteristics, the information accuracy assessments being identified. The information accuracy assessments cover the accuracy indicators, assessments indicators, information types to be assessed for accuracy, stages of the accuracy assessments, assessment processes, accuracy ratings and accuracy levels. The tourism information content and source indicators have been identified assessments as the accuracy indicators. Three important aspects to ensure accuracy of tourism information are information content, source and assessment of content and source. Thus, the information content and source indicators have to be from reliable source. The information source and content will be to be validated in terms of information credibility and accuracy. The assessments indicators cover the necessary measures required for information accuracy assessments. The list of the assessments indicators and assessment focal has been listed in figure 2. The information accuracy assessments have four distinct stages and the assessments of these stages are preliminary, administration, measurement and verification. The assessments indicators cover the necessary measures required for information accuracy assessments. The list of the assessments indicators and assessment focal has been listed in figure 2. The information accuracy assessments have four distinct stages and the assessments of these stages are preliminary, administration, measurement and verification.



**FIGURE 2.** Tourism Information Accuracy Assessment framework

## 5. Information Accuracy Ratings Result Interpretation

With the framework, the gathering of tourism information and the assessments of the collected tourism information will be conducted as per the information accuracy assessment. The gathered tourism information will be assessed using the information accuracy assessment checklist and rated as met (Yes), not met (No) or partially met (P). The measurement values for the assessments are rated in the range of 1 for (Yes), 0 for (No) and 0.5 for (P). With the score obtained from the assessments, the percentage (%) of the score obtained for each of information accuracy assessments will be computed and will be compared with the Kappa Statistic-agreement (see Table 2) to determine the ratings of information accuracy rate (%) and classifications of the information accuracy (%). Further to the classifications of information accuracy (%) and referenced to the ISO/IEC 15504 standard “Capability Levels of ISO/IEC 15504” (Mesquida *et al.*, 2015), the classifications of information accuracy rate (%) will be classified into five levels of information accuracy (See Table 3).

**TABLE 2.** Suggested Rating Information Accuracy

Info. Accuracy Rate (%)	Kappa Stats.	Kappa Agreement	Suggested Info. Accuracy (classification-s)	Information Accuracy Level
80% to 100%	0.80 to 1.00	Very good	Very good	Level 5
60% to 80%	0.60 to 0.80	Good	Good	Level 4
40% to 60%	0.40 to 0.60	Moderate	Moderate	Level 3
20% to 40%	0.20 to 0.40	Fair	Fair	Level 2
Less than 20%	Less than 0.20	Poor	Poor	Level 1
80% to 100%	0.80 to 1.00	Very good	Very good	Level 5
60% to 80%	0.60 to 0.80	Good	Good	Level 4

Table 3, provides the results interpretation of information accuracy levels. The information accuracy levels are from level 1 to level 5 with each level information accuracy levels have been explained in Table 3.

**TABLE 3.** Information Accuracy Levels and Descriptions

Information Accuracy Level	Description Information Accuracy Level
Level 5 (Very Good)	The level meets the information accuracy measures, tourism information, organizational, business and quality characteristics. The assessed tourism information resources are well presented and managed in terms of documentation requirements, information records management and traceability.
Level 4 (Good)	The level meets the information accuracy and consistent with the accuracy measures. There is no a major concern or major none-conformity in terms of tourism information, organizational, business and quality characteristics in producing accurate information.
Level 3 (Moderate)	The accuracy measures are not well performed and managed at a sensible level with insufficient evidences of tourism information, organizational, business and quality characteristics information.
Level 2 (Fair)	None existence of evidences of information accuracy measures and tourism information, organizational, business and quality characteristics are not available and not tracked systematically in producing accurate information.
Level 1 (Poor)	There is a general failure to accomplish the tourism information, organizational, business and quality characteristics. There are insignificant or no certainly existent of any evidences to produce accurate information measures.

## 6. Experts' Assessment Of Framework

The tourism experts given with the framework usability assessment form. The framework usability assessment form contains the framework assessment attributes, likelihood of incidence occurrence, mitigation plan or suggestion from experts to improve the framework usability. The assessment of the framework usability likelihood assessment of the framework attributes is based on the options (Likert-type scale, see Table 4).

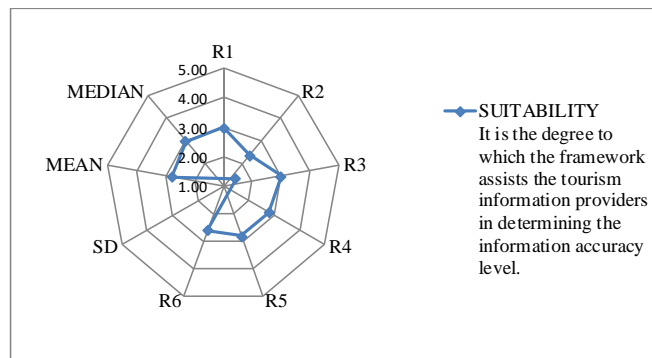
**TABLE 4.** Likert-type scale

Likert-type scale					
Point	1	2	3	4	5
Option	Very Low	Low	Average	High	Very High

To measure the usability of the framework, we adopted the subjective rating method proposed by Moody and Glass (2016). We use the polar chart to explain the experts' scores based on the review evaluation results to identify the framework usability issues.

### i. Framework Suitability.

The assessment of the framework suitability covers the degree to which the framework assists the tourism information providers in determining the information accuracy level. The framework suitability attributes in this expert reviews are low percentage of the framework in determining information accuracy levels, inappropriateness of information accuracy levels, incomplete and insufficient information accuracy assessments depth and categories to determine the information accuracy levels, lack of tourism information accuracy relevancy and needs with the developed information accuracy assessments categories and details and inability of the framework to adapt to the mass and complex tourism information changes. With reference to the Figure 3 and rated by the tourism experts, the suitability of framework mean score is (2.77), median score is (3.00) and standard deviation is (0.50).

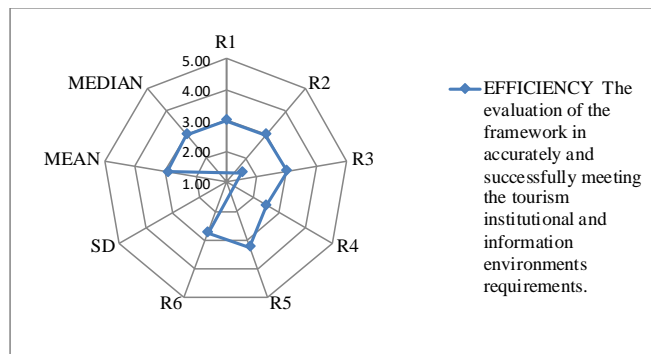


**FIGURE 3.** The framework suitability score

### ii. Framework Efficiency

The framework efficiency evaluation consists of the framework in accurately and successfully meeting the tourism institutional and information environment requirements. The assessment for framework efficiency covers the attributes such as free of error information and result produced, lack or irrelevant information accuracy assessments in determining the information accuracy levels, longer execution time or time constraints of information accuracy assessments categories

implementation and moderate requirements and adequacy of resources required for implementation of framework.

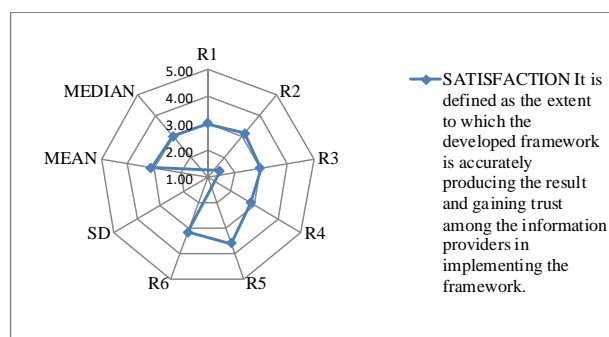


**FIGURE 4.** Framework Efficiency score

With reference to the Figure 4, the efficiency of the framework efficiency attributes mean score is (2.92), median score is (3.00) and standard deviation (0.41).

**iii. Framework Satisfaction**

It is defined as the extent to which the developed framework is accurately producing the result and gaining trust among the information providers in implementing the framework. The attributes been assessed for the framework satisfaction are the framework is not likely preferred to be implemented by the information providers, framework lack of depth in information accuracy assessments details, the developed information accuracy assessments provides professional independence such as the extent to which the information providers producing information is independent or dependent from other tourism policy, regulatory or administrative departments and bodies and potential conflict of interest, framework lack of trust, lack of enthusiasm by the information providers in implementing the framework, the framework is unable to fulfil the tourism institutional and information needs, the framework is confusing in terms of determining if information accuracy levels and defeats the objective and aim of tourism institutional and information requirements and confusing or doubtful of information accuracy assessments details.



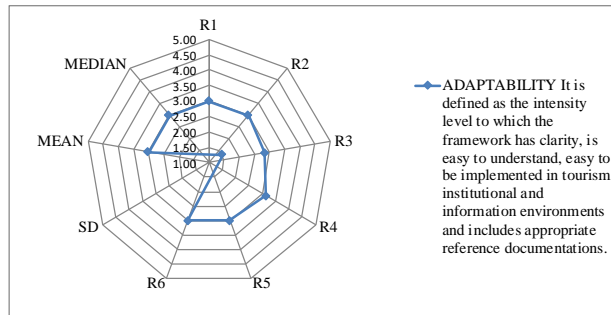
**FIGURE 5.** The framework Satisfaction score

With reference to the Figure 8, the satisfaction assessment of framework scores are mean (3.00), median (3.12) and standard deviation (0.45).

**iv. Framework Adaptability**

It is defined as the intensity level to which the framework has clarity, is easy to understand, easy to be implemented in tourism institutional and information environments and includes appropriate

reference documentations. The assessment adaptability attributes are lack of clarity in information accuracy assessments, high complexity in performing information accuracy assessments and result interpretation, inability to understand the framework, longer time or time consuming to learn and implement the framework, unable to follow the information accuracy assessments of the framework, incomplete and inadequate documentation and insufficient support in implementing the framework.

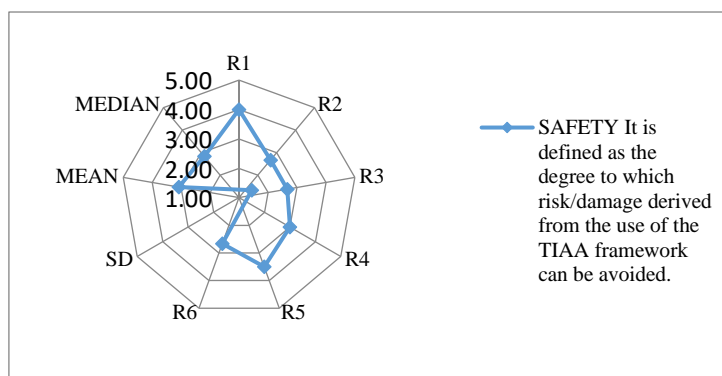


**FIGURE 6.** The framework adaptability score

With reference to the Figure 6, the framework adaptability attributes assessment scores are mean (3.17), median (3.00) and standard deviation (0.42).

**v. Framework Safety**

It is defined as the degree to which risk or damage derived from the use of the framework can be avoided. The assessment attribute are loss of information or data or causing information traceability issues, high vulnerability threat of information accuracy determination, high risk of existing tourism institutional and information accuracy assessment or evaluation methodology failure, high risk of framework implementation failure, tourism institutional and information environment prone to danger in terms of information management and change in working culture and environment of existing information management system.



**FIGURE 7.** The framework safety score

With reference to the Figure 7, the safety attributes assessment of framework scores are mean (3.08), median (2.83) and standard deviation (0.50).



## 7. Usability Issues Identification

The results of the usability issues identification process will be a comprehensive list of potential usability issues that might affect the implementation of the framework in tourism environment. In line with the usability issues identification, in this research, the preliminary findings found 8 issues and potential found 8 issues. The following sections provide the details of these issues.

### Preliminary and Potential Usability Issues

The followings are the list of issues related usability of the framework indicated by the respondents. We have classified them into preliminary and potential issues. Table 5 provide the list of issues related to the usability of the framework.

**TABLE 5.** List of issues

Issues	Description of identified usability issues
Clarity of the information accuracy assessments and categories.	This issue related to the framework assessment ambiguity and extend of the accuracy assessments to assist the information providers to evaluate tourism information accuracy levels.
The integrity and quality of the assessment.	This issue relates to the reliability of the information accuracy assessments in determining the information accuracy levels. Characteristics of the information accuracy assessments and how the assessments are in line with tourism information needs.
Stakeholders commitments.	The tourism information providers' commitments in implementing the framework in line with their business process.
Framework customization.	Percentage (%) of modification or revision can be made with the framework to cater for the tourism information needs or changes in future.
Types of information and requirement for dissemination.	Accuracy assessments cater for what type of tourism information.
Identification of information requirements.	Information requirements or information source and content for accuracy assessments.
How the framework will adapt to the information changes or information requirement changes.	Extend of the framework to cater for the tourism information growth and information requirements changes in the digital age.
Stakeholders commitments.	Not all the tourism information providers able to commit in implementing the framework.
How to manage mass and complex tourism information.	Tourism is the industry with mass and complex information and extends of the framework information accuracy assessments in determining the information accuracy levels.
Information verification process tedious and not clear.	Wearying of information verification process may not able to cater for the fast growing information in the digital age. The information verification process to be defined clearly.
Information can be exposed to many parties. So privacy must be maintained at all time.	Information confidentiality in performing the assessments.

The implementation of this framework might not get sufficient support due to the time and resources required to do the assessment.	The implementation of the framework may not successful due to the resources required and stakeholders' interest.
Information accuracy assessment methodology.	Clarify of the information accuracy assessments is essential in evaluating the tourism information.
Clear guide how to apply this framework in tourism environment.	The implementation of the framework in a tourism environment requires clear guidelines and the constraints of the implementation need to be detailed.

Based on the reviews by the experts, the following actions were carried out and the framework was amended accordingly.

- i. The sample size of the accuracy assessments has been added to determine the accuracy assessment effectiveness and the information accuracy categories and assessments have been detailed to ensure the accuracy assessments clarity.
- ii. The process of the accuracy assessments and methodology has been updated to provide clear guidelines for the information providers in performing the accuracy assessment.
- iii. The accuracy assessment checklist has been updated with the clear instructions and the assessment weighting has been reviewed and assessment benchmark provided.
- iv. The necessary terminologies have been updated and made it clear in the framework.
- v. Tourism institution and types of tourism information has been defined in the framework and the information environments for accuracy assessment has been explained and detailed.
- vi. Tourism information requirements defined in the framework and the information accuracy assessments stages explained and enhanced to ensure the information providers are clear and able to assess mass and complex tourism information.
- vii. The information independency and information policy of tourism information has been considered and framework has been updated accordingly.
- viii. Information accuracy assessment checklist tailored and added with procedural information accuracy assessments to perform the accuracy assessments.
- ix. The tourism institution and information requirements clearly defined in the framework and steps of information verification have been provided and framework updated.

## 8. Conclusion

In this paper, we have reported the evaluation results, analysis and action taken based on experts' recommendations. We have defined the evaluation processes, criteria enabling the evaluation and scale of measurement of the framework evaluation. This approach involves a precise definition of what is expected from the evaluation of the framework. The selection of experts for the evaluation purpose predetermined clearly and our sample size is currently only based on tourism information experts in performing the evaluation. The selections of the experts are based on the selection criteria applied during respondent selection and their willingness to participate in this evaluation exercise. On the usability evaluation of the framework, there were usability issues indicated by the experts. We have provided the description for each issue and analyses them. The identification of the usability issues related to the framework obtained and extracted from the experts' feedbacks and recommendation in the expert evaluation. In addition to this, with all the usability issues identifications, we have discussed all of them and action plans.

## Acknowledgments

We would like to thank all our respondents in the data collection phase for their valuable inputs and feedbacks.

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