A Proposed Tourism Information Accuracy Assessment (TIAA) Framework

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Abstract. In the tourism business, there is an urgent need to provide better information accuracy levels. The information accuracy gaps and issues are affecting the tourism stakeholders from making informed decisions. The proposed Tourism Information Accuracy Assessment (TIAA) framework strongly underscores the need for accurate tourism information. The proposed framework is adapted from the ISO/IEC 9126 standard for tourism information resource, environment, assessment and quality process identification and the existing methodologies of information quality assessment in determining the framework information accuracy dimensions, accuracy characteristics and indicator identification. In this article, we will explain the proposed framework in terms of the information accuracy factors, sub-factors, dimensions, accuracy characteristics and accuracy assessments. The framework will be evaluated by tourism experts. The tourism experts' reviews and findings will be discussed in the analysis and results presentation sections.

Keywords: Tourism information · Information accuracy
Information assessments · Information quality

1 Introduction

The tourism industry is well known for its mass and complex information [1]. The industry, in line with the digital information age, plays a vital role in most of the country's economic development [2]. Increases in information needs in tourism have given rise to an increased need for information accuracy by the tourism stakeholders in their decision making processes [1, 3]. Generally, information accuracy can be defined as the capability of the existing processes or procedures or systems to provide precise information to the users for their own needs and requirements [4]. Information accuracy also can be defined as the precise level of delivered information compared to the actual source [5]. Information accuracy which is supported by quality dimensions or attributes

is able to trigger the proper management of the information [5]. In tourism, the information sources and information providers play an important role in providing accurate information to tourism stakeholders for their decision making processes [3]. In the tourism information environment, there is always room for questioning the information accuracy of the available tourism information [1]. There is a distinct possibility that the tourism organizations could mistakenly provide misleading, confusing, outdated and statements that lack credibility because of information source accuracy issues [1, 3, 6, 7]. Furthermore, the inaccurate information through the information sources can cause confusion in the tourism stakeholders' decision making process [8]. The information gaps in tourism are often suspicious. Therefore, correct information sources are greatly needed. The tourism information accessibility and its sources are provided by tourism agencies, tourism commissions, regulatory bodies, tourism information centers and other sources. The quality and accuracy of the available information can be questioned as well [8]. Information accuracy is an important aspect that must be encouraged, managed, observed and maintained by the tourism information providers in order to enable the tourism stakeholders to make precise and informed decisions. The tourism information accuracy problems are triggered by mass, complex and inaccurate tourism information that are disseminated in a tourism environment without quality information accuracy assessment methods. Thus, the tourism information that has been disseminated has been low in quality, inaccurate, inconsistent and incomplete and this has affected the tourism information stakeholders' decision making abilities [1, 9]. Furthermore, according to (Kourouthanassis et al. [1], Li et al. [3]), information credibility is one of the decisive factors in the decision making process. Taking into consideration the gaps in tourism information accuracy, a vital information accuracy assessment framework is therefore essential for the tourism business to improve its information accuracy.

2 Tourism Information Accuracy Assessment (TIAA) Framework

The TIAA framework methodology and framework assessment details will be explained in the following sections.

2.1 Framework Development Methodology

The framework development considers the relevant and existing common generic information assessments practices. The relevancy of the existing common generic information assessment practices has been referred as guides in developing the TIAA framework. The ISO/IEC 9126 standard has been referred during the tourism information resource, environment, assessment and quality processes [10–14]. The quality model framework approach such as the quality process and the quality attributes in ISO/IEC 9126 standard has been referred in the development of the framework as well. The ISO/IEC 15504 standard has been referred during the assessment process in assigning the accuracy indicators, assessment indicators and accuracy levels with this standard "Capability Levels of ISO/IEC 15504" [15]. As for the rating information

accuracy, we have followed the KAPPA statistical techniques in measuring the accuracy assessment results [16]. Thus, with the referred information, the TIAA framework consists of information accuracy factors, sub-factors, dimensions, accuracy characteristics, accuracy assessments and assessment results interpretations as the general conceptual architecture (see Fig. 1).
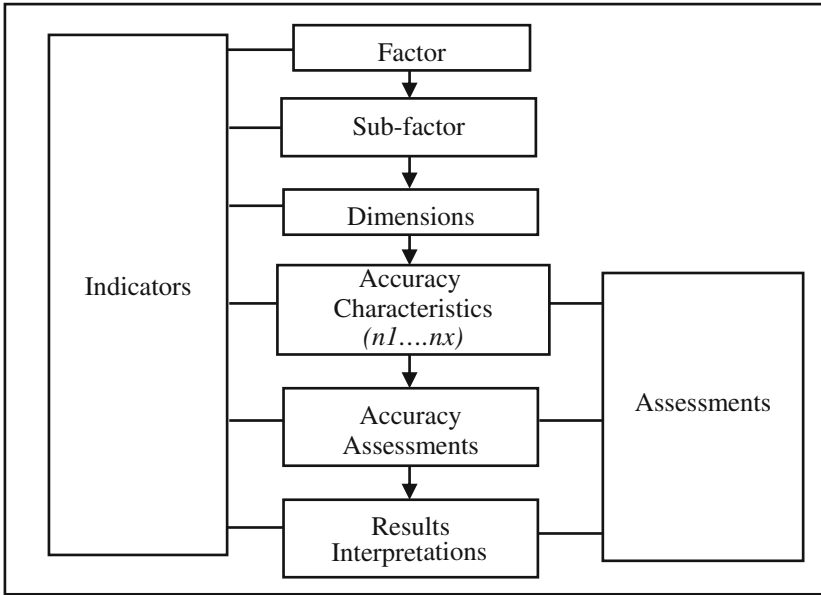

Fig. 1. TIAA framework architecture

Figure 2 illustrates the TIAA framework and the details of the framework have been explained in the following sections.

2.1.1   Factor
Factor is referring to the tourism information "Accuracy" in the development of the framework.

2.1.2   Sub Factors and Dimensions
The TIAA framework sub factors consist of tourism institutional and information environments. The tourism institutional environment refers to the tourism institutional information organizational and business dimensions. The tourism information environment contains data quality dimensions.

2.1.3   Tourism Institutional Environment
The tourism institutional environment is defined in terms of the information organizational & business dimensions. Appended are the characteristics of organizational & business dimensions:

- **Fairness and objectivity:** the initiation of tourism information is undertaken in an objective, professional and transparent manner.
- **Professional independence:** the extent to which the information providers producing information are independent or dependent from other tourism policies, regulatory or administrative departments and bodies and potential conflicts of interest.
- **Adequacy of resources:** the extent to which the resources available to the information providers are sufficient to meet its needs in terms of the development, capturing and coverage of information.
- **Quality commitment:** the extent to which procedures and processes, staff and facilities are in place to ensure that the information produced is commensurate with their internal quality objectives or measures.
- **Statistical confidentiality:** the extent to which the privacy of information providers and the confidentiality of the information they provide are guaranteed (if relevant).

2.1.4   Information Environment Data Quality Dimension

The following are the characteristics of information environment data quality dimensions:

- **Completeness:** Breadth, depth and scope: the extent to which information has sufficient breadth, depth and scope of the task at hand in accordance to the tourism perspective.
- **Consistency:** integrity constraints involve differences in the information received compared to the actual source.
- **Timeliness, Currency, Traceability:** this refers to the time lag between the reference period and when the information actually becomes available.
- **Credibility, Correctness, Reputation, Reliability:** Information source and content: representing whether a source and content can provide the right information, is free from errors, is trusted or is highly regarded in terms of the source and content.
- **Volatility—Time length:** time length for which information remains valid and relevant.

2.1.5   Accuracy Assessment

The accuracy assessments consist of accuracy and assessment indicators.

Accuracy Indicators

The information content and source indicators have been identified as the accuracy indicators. Appended below are the details of the accuracy indicators:

- Information source and content refer to the tourism information.
- Information source assessment and results validation.

Table 1. Assessments indicators

Assessment indicators	Information assessments focal
Information coverage	Source and content
Information capture and collection	Collection and gathering
Information depth	Mismatch and consistency
Information edit and imputation	Logical and consistent
Information processing and estimation	Processing of raw information
Information document and currency	Information state
Information standard	Information elements
Information standardization	Completeness and originality
Information historical comparability	Historical changes
Information adaptability	Traceability
Information value	Information usage and gap analysis

Assessments Indicators

Table 1 provides the list of these indicators measures:

2.1.6 Assessments Stages and Process

The information accuracy assessments have four distinct stages and the assessments of these stages are explained below:

- **Preliminary**—The "Preliminary" stage involves the gathering of tourism information which includes tourism information capture, collection and coverage assessments.
- **Administration**—The "Administration" stage involves tourism information processing, editing and accessing the input.
- **Measurement**—The "Measurement" stage evaluates the accuracy of the information.
- **Verification**—The "Verification" stage verifies the accuracy of the information standards, standardization, accessibility and adaptability.

2.1.7 Information Accuracy Ratings

The information is rated as met (Yes = 1), not met (No = 0) or partially met (P = 0.5). With the scores from these assessments, a percentage (%) of the scores for each of information accuracy assessments will be computed and will be compared with the Kappa Statistic-agreement (see Table 2) in order to determine the information accuracy level (see Table 3).
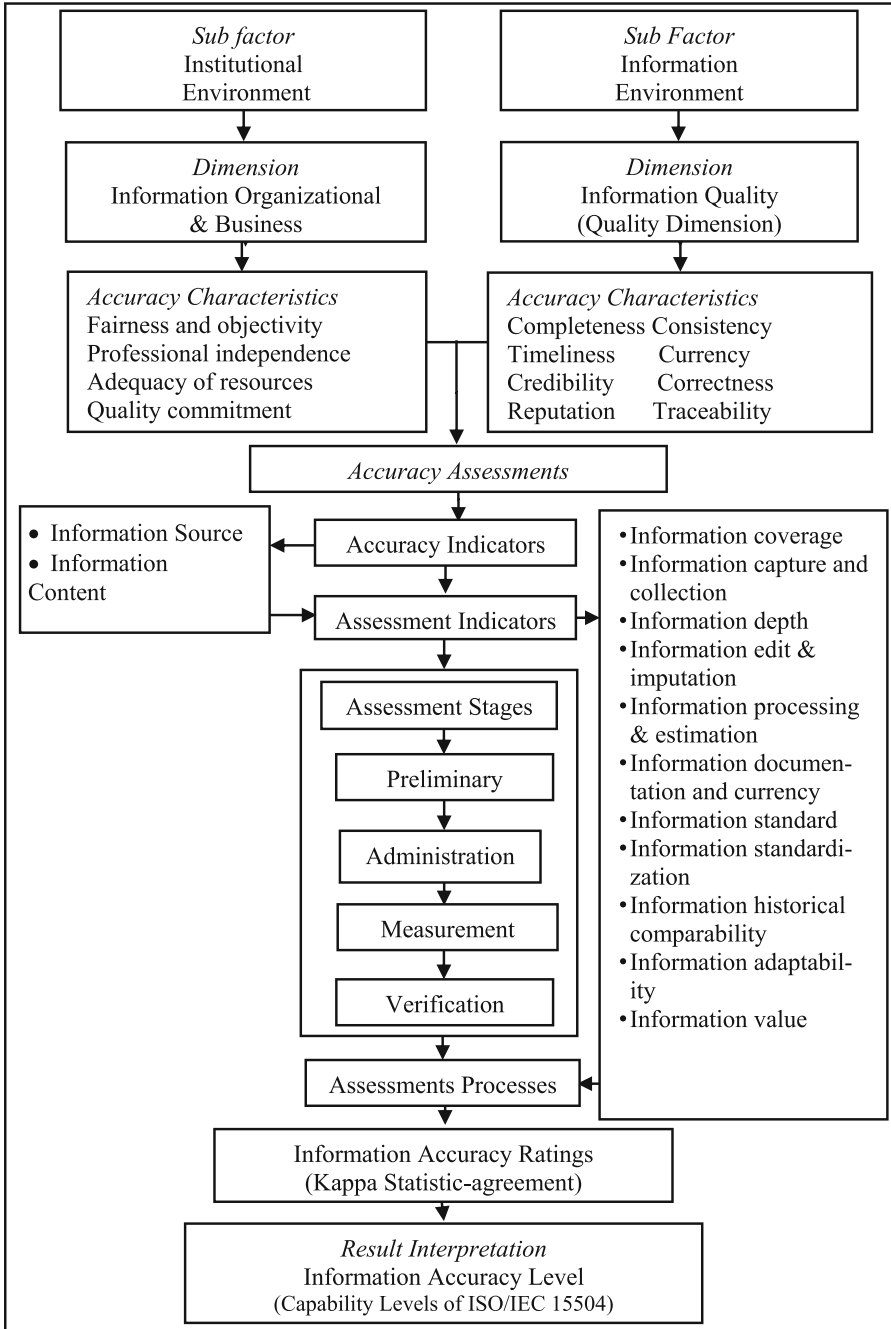
Fig. 2. Tourism information accuracy assessment (TIAA) framework

Table 2. Suggested rating information accuracy

Verification information accuracy rate (%)	Kappa statistic	Kappa agreement	Information accuracy
80% to 100%	0.80 to 1.00	Very good	Level 5
60% to 80%	0.60 to 0.80	Good	Level 4
40% to 60%	0.40 to 0.60	Moderate	Level 3
20% to 40%	0.20 to 0.40	Fair	Level 2
Less than 20%	Less than 0.20	Poor	Level 1

Table 3. Information accuracy levels and descriptions

Information accuracy	Description information accuracy level
Level 5	Meets the information accuracy measures
Level 4	Meets the information accuracy consistency
Level 3	The accuracy measures are not well performed and managed
Level 2	None existence of evidences of information accuracy measures
Level 1	General failure to accomplish the tourism information accuracy

2.2   Analysis and Result

This section presents the results of the TIAA framework evaluation. As an extension of the tourism information, the TIAA framework evaluation is aimed at evaluating the usability of the TIAA framework in a tourism information environment in terms of framework suitability, efficiency, satisfaction, adaptability and safety as proposed by Larusdottir [17], Shackel [18], Riihiaho [19] in the usability evaluation in software development practice. The selection framework usability attributes are based on factors that can influence and determine the information accuracy levels in tourism information and institution environments. The usability evaluation has been conducted using the expert review evaluation methodology proposed by Ayyub [20]. The framework's expert review forms were furnished to the identified tourism experts in performing the evaluation. The framework's suitability, efficiency, satisfaction, adaptability and safety were evaluated by the tourism experts using a Likert-type scale, with point scores of 1 (very Low), 2 (low), 3 (average), 4 (high) and 5 (very high). Table 4 provides the results of the expert review.

Table 4. Framework expert score framework usability

Usability evaluation	R1	R2	R3	R4	R5	SD	Mean	Median
Suitability	3	2	3	3	3	0.5	2.8	3.00
Efficiency	3	3	3	3	3	0.39	2.95	3.00
Satisfaction	3	3	3	3	4	0.47	3.11	3.00
Adaptability	3	3	3	3	3	0.49	3.00	3.00
Safety	3	3	3	3	4	0.49	2.97	3.00

3 Conclusion

In this article, we have explained the TIAA framework in supporting the tourism information providers in ensuring tourism information accuracy levels. The proposed TIAA framework is based on prior information and research that have been carried out to sustain and maintain tourism information accuracy. In the proposed TIAA framework, we have covered a broad range of areas and have developed information accuracy assessments so that the tourism information provided is reliable, accurate and relevant.

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