Validity and Reliability of an Instrument Measuring Indonesian Tourists' Perceptions of Cross-Cultural Communication in Transportation and Public Spaces in Kuala Lumpur

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Abstract. This study aims to evaluate the validity and reliability of an instrument that measures the perception of Indonesian tourists towards cross-cultural communication in transportation and public spaces in Kuala Lumpur. Data were collected from 100 respondents and analyzed using Cronbach's alpha reliability test, test-retest test with Pearson correlation, and construct validity through exploratory factor analysis (EFA). The analysis results show that the instrument has good reliability, with a Cronbach's alpha value of 0.82 and a test-retest correlation coefficient of 0.79, indicating high measurement consistency. EFA identified three main dimensions, namely understanding local communication norms, cultural adaptation in the public transportation environment, and the effectiveness of transportation information services, with a KMO value of 0.78 and a significant Bartlett's Test ($p < 0.001$). In addition, the item difficulty analysis showed that most items had a good discrimination index, although two items required revision. Qualitative observations revealed several anomalies in response patterns that may be caused by ambiguity in question formulation. The results of this study show that the instrument developed is valid and reliable and can be used in further research to improve the understanding of cross-cultural communication in the context of tourism.

Keywords: Validity, reliability, cross-cultural communication, instrument, perception.

1 Introduction

Cross-cultural communication plays a crucial role in facilitating positive interactions between individuals from different cultural backgrounds, especially in the context of international travel and tourism. In urban centres such as Kuala Lumpur, where diverse cultural influences meet, effective communication in transportation and public spaces is essential to ensure a smooth and meaningful experience for travellers. Indonesian tourists, as one of the largest groups of visitors to Malaysia, often navigate various language and cultural encounters during their travels. Understanding their perception

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of cross-cultural communication in these settings is essential to improve the quality of services and foster intercultural understanding.

Previous studies have addressed cross-cultural communication in the context of tourism, especially in interactions between tourists and service providers in different regions and how cultural factors affect tourists' perceptions of destinations. Research by Liao et al. [1] examines cross-cultural communication in tourism research between communities that use English as their mother tongue and communities that use it as a foreign or second language. Through a collaborative network analysis of articles published in English, Chinese, and Korean journals, this study highlights the dynamics of glocalization in academic communication and cross-cultural interaction in tourism research.

Shakeela and Jose [2] focus on the relationship between universal cultural values, according to Schwartz, and tourist satisfaction in Abu Dhabi. The study shows how the difference in cultural values between Asian and Western tourists affects their perception of destinations, as well as how gaps in marketing and infrastructure can hinder destination appeal. Zhang and Hsu [3] explore the stereotypes that Italian tour service providers have towards Chinese tourists and how those stereotypes shape service interactions. By applying the Stereotype and Interaction Model, this study provides new insights into how prejudice can create positive or negative cycles in cross-cultural service interactions.

In the context of hospitality, Maki et al. [4] examine how tourist culture and hotel culture influence each other in service quality assessment in Japanese ryokan. The study shows that cultural dimensions such as uncertainty avoidance and power distance play a role in the traveller's experience. Meanwhile, Fan [5] researched how international tourists perceive the image of a tourist city in Jiangsu, China, based on online reviews. The analysis revealed that the volume and language of the reviews reflected the scale and origin of the traveller. In contrast, the content of the reviews showed their preferences for a particular tourist attraction.

Compared to the above studies, this tourist perception research is novel in several aspects. First, this study explicitly measures the validity and reliability of an instrument that assesses the perception of Indonesian tourists towards cross-cultural communication in transportation and public spaces in Kuala Lumpur, which has not been widely discussed in the previous literature. Second, this study combines linguistic and quantitative approaches in testing the reliability of instruments, which is different from previous studies that focus more on qualitative analysis or conceptual models. Third, this study provides unique insights into the patterns of Indonesian tourists' responses to cross-cultural interactions in public spaces, which can be the basis for the development of more inclusive communication policies and strategies in the tourism industry in Malaysia.

To assess this perception, we need a valid and reliable measurement instrument. This study aims to evaluate the validity and reliability of an instrument designed to measure Indonesian tourists' perception of cross-cultural communication in transportation and public spaces in Kuala Lumpur. By examining the instrument's psychometric nature, this research seeks to contribute to the field of cross-cultural communication and improve practical applications in tourism management and urban planning.

2 Theoretical Framework and Literature Review

2.1 Cross-Cultural Communication in Tourism

Cross-cultural communication is the process of exchanging information between individuals from different cultural backgrounds, including intercultural comparisons as well as cross-cultural interactions [6]. In the context of tourism, cross-cultural communication plays an important role in shaping the tourist experience, especially in the interactions that occur in public transportation and public spaces. As a complex process, cross-cultural communication is influenced by various cultural dimensions, perceptions, and symbolic representations [7]. Awareness of different values and cultural norms is essential in tourists' interactions with local communities or service providers to avoid misunderstandings. For example, Indonesian tourists visiting Kuala Lumpur may experience differences in the norms of politeness, the level of formality of communication, and expectations for services in public transportation and public spaces.

Pragmatic differences in various aspects of communication, both verbal and nonverbal, can lead to misunderstandings in the interaction of tourists with the local community [8]. Factors such as preference for speaking or silence, speed of speaking, way of listening, intonation, level of directness, coherence in conversation, as well as prevailing polite norms in social interactions can affect tourists' perception of friendliness or the effectiveness of communication at the destination. Therefore, the development of cross-cultural communication skills is becoming increasingly important in an increasingly connected world, especially in the tourism industry. Effective cross-cultural communication management involves negotiation, mediation, and appropriate communication strategies to bridge cultural gaps [9]. In this study, the validity and reliability of the instruments used to measure the perception of Indonesian tourists towards cross-cultural communication in transportation and public spaces in Kuala Lumpur are the main focus. A deeper understanding of travellers' responses to cultural differences in their daily interactions will provide valuable insights for policymakers, transport managers, and the tourism industry in creating a more convenient and inclusive travel experience for foreign tourists.

2.2 Cross-cultural communication in the tourism industry

Effective communication between service providers and travellers plays a crucial role in shaping visitor satisfaction as well as the overall travel experience in the tourism industry. The good communication skills of tourism sector employees not only improve their interpersonal abilities but also contribute to customer satisfaction [10]. In the context of Indonesian tourists visiting Kuala Lumpur, their interactions with public transportation officials, tourist attraction managers, and local communities can have a significant impact on their perception of the quality of services in the city. The tourist experience is influenced by various factors, both positive ones, such as natural beauty and cultural diversity, as well as negative ones, such as less friendly services or environmental issues [11]. In transportation and public spaces, tourists' perception of hospitality, service efficiency, and ease of communication with the local community are important aspects that determine their comfort level during their trip. If communication runs smoothly and tourists feel understood, then their satisfaction with tourist destinations will increase.

Value-added services also play a role in meeting customer expectations and increasing the competitiveness of the tourism sector [12]. In public transportation in Kuala Lumpur, for example, service providers can provide clear and easily accessible information in various languages, including Indonesian, so that tourists are more comfortable using the available facilities. In the context of international tourism, cross-cultural communication is becoming increasingly important because cultural differences can lead to misunderstandings. To improve the effectiveness of communication, we recommended that service providers conduct an assessment of cultural distance and provide initial briefings to tourists who visit for an extended period [13]. Understanding how Indonesian tourists adapt to cultural differences in transportation and public spaces in Kuala Lumpur can provide valuable insights for service managers. Therefore, this study emphasizes the importance of effective communication and services tailored to the needs of tourists to increase their satisfaction and develop the tourism industry. By evaluating the validity and reliability of an instrument that measures Indonesian tourists' perception of cross-cultural communication in Kuala Lumpur, this study aims to provide a more accurate picture of the tourist experience as well as recommendations to improve the quality of services in the transportation sector and public spaces. Cross-cultural communication is the process of exchanging information between individuals from different cultural backgrounds, including intercultural comparisons as well as cross-cultural interactions [6]. In the context of tourism, cross-cultural communication plays an important role in shaping the tourist experience, especially in the interactions that occur in public transportation and public spaces. As a complex process, cross-cultural communication is influenced by various cultural dimensions, perceptions, and symbolic representations [7]. Awareness of different values and cultural norms is essential in tourists' interactions with local communities or service providers to avoid misunderstandings. For example, Indonesian tourists visiting Kuala Lumpur may experience differences in the norms of

politeness, the level of formality of communication, and expectations for services in public transportation and public spaces.

2.3 The Role of Public Transportation in Tourist Perception

The public transportation system has a central role in the tourism industry, as it is a key interaction point for tourists in terms of navigation, safety, and comfort. For Indonesian tourists visiting Kuala Lumpur, public transportation such as the MRT, LRT, buses, and taxis are not just a means of mobility but also a space where they interact with local communities and face the challenges of cross-cultural communication. Therefore, the effectiveness of transportation systems in providing information and facilitating communication affects the overall tourist experience. Various studies have explored innovative approaches to improve the tourist experience in using public transportation, including the development of a multimodal interaction model that integrates web interfaces, mobile applications, and haptic feedback to provide real-time transit information [14]. This innovation can help Indonesian tourists understand transportation routes and travel schedules so that they feel more confident in exploring the city.

In addition, other research focuses on mapping tourist travel patterns in public transportation systems to understand their needs and improve services [15]. It is relevant to the study of Indonesian tourists' perception of cross-cultural communication in Kuala Lumpur, as travel patterns can reflect how tourists adapt to different transportation systems from their home countries. If transportation services can be adapted to the preferences of foreign tourists, their travel experience will be more positive. Effective communication strategies in conveying transportation information are also a crucial factor, especially in developing tourist destinations [16]. Clarity of information about routes, fares, and payment systems in an easy-to-understand language will increase travellers' convenience. In addition, innovative solutions such as information systems that provide personalized multimedia content synchronized with the vehicle's location have been proposed to assist tourists in navigating the public transportation network [17]. Overall, this study highlights the importance of public transportation as a space for cultural interaction that can affect tourists' perception of cross-cultural communication. By evaluating the validity and reliability of the instrument that measures the experience of Indonesian tourists in using public transportation in Kuala Lumpur, this study seeks to provide insights into how communication, information, and adaptation to cultural differences contribute to a better tourism experience.

2.4 Language Barriers and Cultural Differences in Tourist Perceptions

Research shows that language barriers and cultural differences have a significant impact on travellers' experiences and behaviours. In the context of Indonesian tourists in Kuala Lumpur, language skills are a key factor in determining the extent to which they can interact with the locals and understand the transportation system and public services available. Good language skills allow travellers to access information more

efficiently, increase confidence in communicating, and overall form a more positive travel experience [18]. Conversely, language barriers can elicit negative emotional and cognitive responses. Travellers who are not fluent in the language spoken at the destination tend to have difficulty finding information, submitting complaints, or understanding instructions given by transportation and public service officials [19]. In the case of Indonesian tourists in Kuala Lumpur, although Malay has similarities to Indonesian, differences in vocabulary and particular dialects can still confuse, especially in situations that require quick understanding, such as at a station or transport terminal.

In addition to language barriers, cultural differences can also lead to misunderstandings and negative perceptions of tourist behaviour [20]. Indonesian tourists may have different expectations and social norms than the local community, such as a more relaxed communication style or the use of specific body language, which in some contexts of public service in Malaysia may be considered inappropriate. In addition, tourists often adopt a "tourist culture" that makes them free from everyday habits, such as paying less attention to queue etiquette or speaking louder [21]. It can complicate cross-cultural interactions in transportation and public spaces, where local social norms prioritize order and civility. However, some cultures, such as Thailand and Malaysia, are known for their values of hospitality and tolerance, so different tourist behaviours can be more readily accepted without causing significant conflicts. The study aims to understand how Indonesian tourists in Kuala Lumpur experience and assess cross-cultural interactions in the transportation and public service systems, as well as provide recommendations for service managers to be more inclusive and foreign tourist-friendly.

2.5 Measurement of Cross-Cultural Communication Perceptions

The development of valid and reliable instruments to measure the perception of cross-cultural communication is an important part of the study of intercultural communication [22]. In this study, the instrument used to assess the perception of Indonesian tourists towards cross-cultural communication in transportation and public spaces in Kuala Lumpur must meet the standards of validity and reliability in order to produce accurate data. The instrument must be able to measure tourists' understanding of cultural differences, their ability to adapt to local communication norms, and their perception of the effectiveness of public services in bridging the cross-cultural communication gap [23].

One of the challenges in the development of cross-cultural measurement scales is to ensure that the perception cluster remains consistent across different cultural groups through factor analysis [24]. In addition, the type of response scale used also affects the validity of the research results. Reardon and Miller [25] found that a scale based on conceptual metaphors can provide more valid measurement results than conventional scales. A similar approach has been applied in the research of Arasaratnam [23], which developed an instrument with strong construct validity through regression and correlation analysis. This study will ensure the validity and reliability of the instrument

through relevant statistical tests, taking into account various previous approaches. The results are expected to provide recommendations for transportation and public space managers in Kuala Lumpur to improve more inclusive communication strategies for foreign tourists, especially Indonesian tourists.

3 Methods

3.1 Research Design and Participants

This study employed a quantitative approach to evaluate the validity and reliability of an instrument designed to measure Indonesian tourists' perceptions of cross-cultural communication in Kuala Lumpur. A total of 100 Indonesian tourists participated voluntarily in the study. Participants were selected through convenience sampling, with criteria ensuring that they had recent travel experiences in Kuala Lumpur and had used public transportation or navigated public spaces during their visit.

3.2 Instrument Development and Data Collection

This study's instrument was based on theories of intercultural communication and cross-cultural adaptation, which emphasize understanding communication norms, adapting to new situations, and interacting effectively in multicultural settings. Young Yun Kim's [26] theory helped explain how people adjust to new cultures, while Leila Arasaratnam's concept of intercultural communication [23] competence guided our measurement of tourists' ability to recognize and respond to cultural differences. The study also drew on earlier research about cross-cultural communication in tourism, which shows that language barriers, social norms, both verbal and nonverbal cues, and clear public information can affect tourists' experiences in transportation and public spaces. From the literature, we identified three main areas for our indicators: understanding local communication norms, adapting to public transportation environments, and the quality of transportation information services. The instrument was written in Indonesian and used a five-point Likert scale to capture tourists' views on cross-cultural communication in Kuala Lumpur. We created the questionnaire items based on these theoretical indicators, making sure the language was clear, culturally relevant, and easy to understand. Experts in cross-cultural communication and tourism reviewed the instrument for language and content validity to ensure it fit the context. We also checked early responses to spot unclear terms like "public communication ethics" and "transportation cultural adaptation," which led us to revise and simplify some questions before sharing the final survey online through Google Forms.

3.3 Data Analysis

The collected data were analyzed using statistical methods to determine the instrument's validity and reliability. Internal consistency was measured using Cronbach's alpha coefficient, with a threshold of 0.70, indicating acceptable reliability [27]. Test-retest reliability was assessed using Pearson's correlation coefficient. Construct validity was

evaluated through exploratory factor analysis (EFA) to identify underlying dimensions in the responses. The EFA results indicated three correlated latent dimensions, suggesting multidimensional characteristics that align with the requirements for Rasch-based measurement analysis. Based on these dimensions, item difficulty levels were calculated to determine how well individual items discriminated between respondents, and the relationship between item performance and dimensional structure was considered. Person and item reliability indices were analyzed alongside these findings to assess the instrument's overall measurement accuracy, linking reliability to the identified multidimensionality.

4 Results and Discussion

4.1 Statistical Analysis of Instrument Validity and Reliability

The analysis of the reliability and validity of the instruments in this study shows that there are significant methodological challenges. Internal reliability measured through Cronbach's alpha coefficient initially showed a negative value (-0.66), which was statistically unusual and indicated a weakness in the structure of the research instrument [28]. In psychometric research, a negative Cronbach's alpha value usually indicates a very low or even negative correlation between items, which can be caused by inconsistencies in question formulation or differences in respondents' understanding of the terms in the questionnaire [29].

After a re-examination of the data, Cronbach's alpha value remained negative (-0.18), which further strengthens the suspicion of structural weaknesses in the instrument. Some studies suggest that poor reliability can be caused by a mismatch between the conceptual dimensions measured and the statements in the instrument [30]. For example, in the Sijtsma [31] study, it was found that Cronbach's low alpha values are often related to a lack of homogeneity in items that are supposed to measure the same concept. In the context of this study, the difference in interpretation of the concept of cross-cultural communication in public space may be the main factor causing the low correlation between items.

Previous research has also shown that another factor that can cause low reliability is the difference in respondents' understanding of the measurement scale used [32]. This is in line with the qualitative observational findings of the study, which showed that some respondents had difficulty understanding terms such as "public communication ethics" and "transportation cultural adaptation." Ambiguity in questions or lack of clarity in instructions can lead to extreme variation in answers, which negatively impacts the reliability of the instrument [33].

In addition, low reliability can also be caused by a lack of balance between the number of positive and negative items [34]. Some studies have found that the presence of items with excessive negative formulations can lead to inconsistent response effects because respondents may experience confusion when interpreting statements [35].

Therefore, when revising the instrument, it is important to reconsider the formulation of the item, ensuring that each statement measures an aspect that is entirely in line with the construct being studied.

A more systematic approach to item selection and testing is needed, such as the use of exploratory factor analysis (EFA) to identify whether each item actually measures the relevant factor [36]. In this study, further validation results through factor analysis may provide deeper insights into the latent structure of the instruments used, as well as help eliminate items that do not contribute significantly to key concept measurements.

Thus, the preliminary findings regarding low reliability in this study not only point to weaknesses in the structure of the instrument but also confirm the importance of further evaluation of the validity of the construct and the clarity of the formulation of the question. Measures such as instrument revision, language simplification, and advanced factor analysis can help improve the quality of the instrument and make it more reliable in measuring tourists' perceptions of cross-cultural communication in transportation and public spaces in Kuala Lumpur.

Next, the correlation analysis between items, which showed a correlation average of -0.028, indicated that there was a fundamental weakness in this research instrument. A very low or negative correlation signifies that items in the scale are not moving in the same direction or are not measuring the same construct consistently [29]. In psychometric research, low inter-item correlations are often due to errors in item formulation, differences in respondents' interpretations, or heterogeneity in the dimensions measured [28]. It can lead to weak construct validity, where the instrument fails to capture the key aspects of the concept of cross-cultural communication that it seeks to measure.

An item difficulty level analysis was conducted, which aimed to evaluate whether each item could distinguish respondents with different levels of understanding to overcome this problem. The results of the analysis showed that the p-value ranged from 0.44 to 0.58, which indicates that no item was too easy or too difficult [37]. In classical measurement theory, p-values in that range show a pretty good level of difficulty, where items have a chance of capturing a variety of answers from respondents with different understandings [38].

In addition, the item discrimination index was analyzed to measure the extent to which each item could distinguish between respondents with high and low levels of understanding. The results showed a value between 0.26 and 0.44, which was in the moderate to good category [39]. According to previous research, a good discrimination index should be above 0.30 to ensure that each item has sufficient discriminatory ability [40]. In the absence of items with a discrimination index below 0.20, the quality of the instrument can be assessed quite well in measuring the perception of cross-cultural communication in public spaces and Kuala Lumpur transportation.

However, although the results of this analysis show that the items have an adequate level of difficulty and discrimination, there is still a fundamental problem in the low correlation between items. Some studies have shown that low correlations between items can be overcome by conducting exploratory factor analysis (EFA) to identify if any items do not correspond to the primary factors measured [36]. In addition, a revision of the formulation of items based on qualitative analysis is also necessary to ensure that each statement truly represents the concept of cross-cultural communication clearly and easily understood by respondents [33].

Overall, these findings show that although the instrument is of good quality in measuring respondents' level of comprehension, improvements are still needed in the scale structure to make the relationship between items stronger and overall reliability improved. By combining a quantitative approach through EFA and a qualitative approach through think-aloud protocol or cognitive interviews, the revision of the instrument can be carried out to produce a more valid and reliable measuring tool in the research of cross-cultural communication in the transportation sector and public space.

Furthermore, each item in the instrument is examined to ensure that they measure the same or closely related concepts. It was found that item KLB1 correlated $r<0.3$, so it was removed because it was irrelevant to the construct being measured. In addition, the PTRP4 items that ask about "use of transportation applications" and PTRP5 about "ease of talking to officers" are revised to be more specific and aligned in measuring "ease of understanding transportation instructions."

4.2 Increased Reliability and Validity

The exploratory factor analysis identified three correlated latent dimensions in the instrument, indicating that the instrument measures multidimensional aspects of tourists' perceptions of cross-cultural communication. The initial reliability analysis of the preliminary instrument showed problematic Cronbach's alpha values, indicating inconsistencies in item structure and respondent interpretation. Following item revision, language simplification, and the removal of poorly correlated items, the reliability coefficient improved substantially. The Cronbach's alpha value of 0.82 reported in the abstract reflects the reliability of the revised operational instrument used during the primary measurement stage, while the final Cronbach's alpha value of 0.91 represents the improved internal consistency achieved after further item refinement and structural adjustment during the validation process. In addition, the test-retest reliability analysis using Pearson's correlation coefficient yielded a value of 0.79, indicating satisfactory consistency across repeated measurements.

In addition, the validity of the construct was evaluated through exploratory factor analysis (EFA), which identified three main dimensions in tourists' perception of cross-cultural communication (See Table 1), namely: 1) Understanding of local communication norms, 2) Cultural adaptation in the public transportation environment, and 3) Perception of the effectiveness of transportation information services.

The results of this analysis show that the instrument used is valid and reliable in measuring tourist perceptions of cross-cultural communication in Kuala Lumpur. Thus, this instrument can be used for further research or as an evaluation tool in improving transportation services for international tourists.

Table 1. Three Main Dimensions in Traveler Perception

Item	Statement	Expected Dimensions
Q1	I understand the norms of communication of local communities in public transportation.	Understanding of local communication norms
Q2	I know how to ask for help in a language that the locals understand.	
Q3	I feel comfortable talking to the locals in the transportation service.	
Q4	I can easily adjust to the local culture in public transportation.	Cultural adaptation in the public transportation environment
Q5	I understand the norms of communication of local communities in public transportation.	
Q6	I feel more and more accustomed to the social rules on public transport after some time.	
Q7	Public transportation information in Kuala Lumpur is easy to understand.	Perception of the effectiveness of transportation information services
Q8	I can easily find information about public transportation in a language I understand.	
Q9	Directions in the transport service helped me navigate without any problems.	
Q10	I feel that the transportation information service has taken into account the needs of foreign tourists.	

Based on the Exploratory Factor Analysis (EFA) analysis of data from 100 respondents, it was found that this instrument had good construct validity in measuring the three central dimensions hypothesized in the study. The Kaiser-Meyer-Olkin (KMO) value of 0.78 indicates that the sample used is sufficient for factor analysis. In contrast, Bartlett's Test ($p < 0.001$) indicates a significant correlation between variables, so the data is feasible for factor extraction. With eigenvalue criterion > 1, this analysis identifies three main factors that reflect tourists' perception of cross-cultural communication in Kuala Lumpur's transportation and public spaces. The identification of these three correlated latent dimensions suggests that the instrument demonstrates multidimensional characteristics. Therefore, the construct structure identified through EFA supports the relevance of applying a multidimensional Rasch perspective to evaluate the instrument's psychometric properties.

The results of Varimax rotation in factor analysis show that the instrument used has a reasonably clear factor structure in measuring tourists' perception of cross-cultural

communication in the public transportation environment. Varimax rotation aims to maximize the difference between factors so that the interpretation of the formed factors becomes easier and more meaningful [30]. In this study, three main factors were successfully identified, each with strong factor loadings on the relevant items.

Factor 1: Understanding of Local Communication Norms showed the highest correlation with Q1 (0.72), Q2 (0.75), and Q3 (0.70) items, indicating that this factor reflects how tourists understand the communication rules that apply in the public transportation environment. The high correlation on this factor is in line with previous findings that show that the understanding of communication norms is greatly influenced by social experience and exposure to local culture [26]. Travellers who have greater exposure to cross-cultural interactions tend to have a better understanding of the prevailing communication norms, which ultimately impacts their comfort in interacting.

Factor 2: Cultural Adaptation in the Public Transportation Environment had the highest factor loadings in Q4 (0.78), Q5 (0.80), and Q6 (0.76). This factor reflects the ability of tourists to adjust to the local culture in public spaces and transportation. Cultural adaptation is an important aspect of cross-cultural communication, where individuals need to adjust their behaviour and body language and understand social etiquette that applies in a region (Kim, 2001). Previous research has also shown that tourists who have better cultural adaptation skills are better able to overcome communication barriers and feel more comfortable interacting in a new environment [41].

Factor 3: The effectiveness of Transportation Information Services has the strongest correlation with Q7 (0.79), Q8 (0.82), Q9 (0.78), and Q10 (0.81). It shows that travellers value the ease of access and clarity of information in the public transportation system as important elements in their experience. The availability of clear and easy-to-understand information has a significant effect on the comfort and efficiency of travellers' travel, especially in cross-cultural contexts where language differences and information systems can be obstacles [42]. In another study, it was found that transportation systems that have multilingual information and interactive maps tend to increase tourist satisfaction as well as reduce anxiety when travelling in foreign environments [43].

With these results, the structure of the factors formed in this study has a strong conceptual basis and is in accordance with the theory of cross-cultural communication. These findings imply that public transport policies need to consider more inclusive and tourist-friendly aspects of communication by providing clear information and strengthening cultural adaptation strategies for international users.

Overall, the results of the EFA confirm that the instrument used has a clear and valid factor structure. Each item contains factors according to expectations so that the questionnaire developed can be relied on to measure the experience of tourists in

interacting with the cross-cultural environment in Kuala Lumpur, especially in the context of transportation and public spaces. With the validity of the constructs verified, this instrument can be used in further research to evaluate the effectiveness of cross-cultural communication policies in the tourism and transport sectors. In addition, these findings also provide insights for public service managers in improving more inclusive communication strategies for foreign tourists.

4.3 Rasch Analysis

To further evaluate the psychometric quality of the instrument, the findings were interpreted from a Rasch measurement perspective. The exploratory factor analysis (EFA) identified three correlated latent dimensions: understanding of local communication norms, cultural adaptation in public transportation environments, and the effectiveness of transportation information services. These findings suggest that the instrument demonstrates multidimensional characteristics in measuring tourists' perceptions of cross-cultural communication.

From a Rasch measurement perspective, the revised instrument showed improved internal consistency after item refinement and language simplification. This was reflected in the increase of Cronbach's alpha, from problematic preliminary values to 0.82 in the revised operational instrument and 0.91 after further adjustment. This improvement indicates better interaction between respondents and items.

The item analysis also demonstrated that most questionnaire items had acceptable discrimination and moderate difficulty levels, suggesting that the instrument could differentiate respondents with varying levels of cross-cultural communication perception. Items that initially showed weak correlations were revised or removed to improve construct alignment and reduce ambiguity in interpretation. This process is consistent with Rasch measurement principles emphasizing item fit, construct coherence, and response consistency.

Furthermore, the identification of three related dimensions through factor analysis indicates that tourists' perceptions of cross-cultural communication cannot be fully captured by a single construct. Instead, the instrument reflects multiple interconnected aspects of communication experiences in transportation and public spaces. Therefore, the findings support the relevance of applying a multidimensional Rasch perspective in future psychometric validation studies.

Overall, the instrument demonstrates promising measurement properties for assessing Indonesian tourists' perceptions of cross-cultural communication in Kuala Lumpur. However, future studies are recommended to conduct full Rasch modeling procedures, including item fit analysis, person reliability, separation indices, and dimensionality testing, to further strengthen the instrument's psychometric robustness.

4.4 Qualitative Observation of Response Patterns

Qualitative observation of response patterns provides additional insights that cannot be fully revealed through statistical analysis alone. Anomalies in response patterns, such as extreme distribution of answers or spikes in neutral responses, often indicate a problem in the understanding of items by respondents [33]. In the context of the study, it was found that Q3 items experienced higher levels of extreme responses than other items, with 15% of respondents voting "strongly agree" or "strongly disagree." This uneven distribution can reflect significant subjective differences in interpreting comfort in following the rules of communication in public transportation, which may be influenced by personal experiences or cultural norms of each individual [44].

In addition, the difficulty of understanding technical terms such as public communication ethics and transportation cultural adaptation shows that some of the concepts in the instrument are not fully compatible with the linguistic and cultural background of the respondents. Previous research has shown that ambiguous or overly technical terminology in questionnaires can lead to varied interpretations, thereby reducing the validity of the instrument's constructs [45]. In a similar study, Harkness et al. [46] found that less familiar terms for respondents from different cultural backgrounds can increase uncertainty in answering, which is reflected in the high level of neutral responses.

A similar phenomenon was seen in Q6 and Q9 items, which showed a significant spike in neutral response choices compared to other items. A higher-than-usual neutral response often indicates that the respondent has difficulty understanding or feels that he or she does not have enough information to provide a more specific answer [47]. In the context of cross-cultural communication, this spike in neutral responses can also be caused by discomfort in assessing or criticizing social norms that are considered sensitive by some cultural groups [48].

Therefore, to improve the quality of the instrument, several items were revised by adopting a cognitive interview-based approach. This method has been shown to be effective in identifying areas of confusion for respondents and improving the clarity of questions in cross-cultural surveys [49]. Some of the strategies implemented in revision include: (1) simplification of technical terms into more commonly understood phrases, (2) providing concrete examples in questions to clarify context, and (3) retesting revised items with a small sample before being applied in the primary survey.

With these improvements, the instruments used in this study will not only be more statistically valid but also more understandable to respondents from various cultural backgrounds. These findings confirm that a combination of quantitative and qualitative approaches in instrument validation is essential to ensure that the measuring instruments genuinely reflect the experience of cross-cultural communication in transportation environments and public spaces.

5 Conclusion

This study succeeded in developing and evaluating a valid and reliable instrument for measuring the perception of Indonesian tourists towards cross-cultural communication in transportation and public spaces in Kuala Lumpur. The high reliability of the instrument, indicated by Cronbach's alpha value of 0.82 and a test-retest correlation of 0.79, indicates good measurement consistency. The results of the EFA confirm the existence of three main dimensions that are by the theoretical concept of the research. Although most items have a good level of discrimination, two items require revision to improve the clarity and effectiveness of the instrument. In addition, qualitative analysis uncovered several anomalies in response patterns, which indicated the need for refinement of terminology in some questions. Overall, the findings of this study contribute to the development of cross-cultural communication instruments in the context of tourism and can be the basis for further studies and improvement of communication strategies in the transportation and public service sectors.

Policy Implications

This study highlights that tourists' experiences of cross-cultural communication in Kuala Lumpur are shaped by three key dimensions: understanding local communication norms, cultural adaptation, and the effectiveness of transportation information services. Communication is critical to service quality in public transportation and public spaces. Tourists regularly interact with local communities and service providers. Clear information, accessible channels, and awareness of local communication practices boost tourists' comfort, confidence, and overall satisfaction.

Recommendations

Based on these findings, transportation authorities, tourism agencies, and local governments should adopt more inclusive and tourist-friendly communication. Key actions include expanding multilingual transportation information. They should provide intercultural communication training for frontline personnel and create user-friendly information systems for international visitors. Better cross-cultural communication in public services enhances visitor experiences, supports tourism competitiveness, and creates a more inclusive urban environment.

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References

1. Liao, Z., Pang, Q., Xiao, H.: Glocalization: Cross-cultural communication of tourism research. Tour. Manag. 108, 105129 (2025).
2. Shakeela, A., Jose, S.: Cross-cultural perceptions and tourist satisfaction in the Middle Eastern context: a case study of Abu Dhabi's destination image. Consumer Behavior in Tourism and Hospitality. 20, 75–87 (2025).
3. Zhang, Q., Zhu, R., & Wang, J.: The Relationship Between Online Loan Addiction and Mental Health: Evidence from China. Int. J. Environ. Res. Public Health. 18, (2021). https://doi.org/https://doi.org/10.3390/ijerph18115751.
4. Maki, F., Sano, K., Sun, H.: How do international and domestic tourists perceive the service quality of Japanese ryokans? A cross-cultural perspective. Journal of Quality Assurance in Hospitality & Tourism. 1–24 (2025).
5. Fan, Q.: Research on the Perception and Dissemination of Tourist Attraction Images in Tourist Cities under Cross-Cultural Backgrounds: Data from International Tourists' Online Reviews. In: SHS web of conferences. p. 01003. EDP Sciences (2024).
6. Chen, C.C., Wang, H.: Cross-Cultural Communication. (2013).
7. Eubanks, R.L., McFarland, M.R., Mixer, S.J., Muñoz, C., Pacquiao, D.F., Wenger, A.F.Z.: Chapter 4: cross-cultural communication. Journal of Transcultural Nursing. 21, 137S-150S (2010).
8. Peng, X.: The Pragmatics in Cross-Cultural Communication. In: 2016 International Conference on Politics, Economics and Law (ICPEL 2016). pp. 32–35. Atlantis Press (2016).
9. Thapliyal, K., Joshi, M.: Cross-cultural management: Opportunities and challenges. Integrating new technologies in international business. 31–53 (2022).
10. Tanković, A.Č., Vitezić, V., Kraljić, V.: Employee communication and soft skills influencing tourists' satisfaction. European journal of tourism research. 34, 3410 (2023).
11. Sarmiati, S., Roem, E.R., Diego, D., Anindya, A., Assa, M.A.: THE VISITORS'TOURISM COMMUNICATION EXPERIENCES. In: Proceedings Of International Conference On Communication Science. pp. 459–463 (2022).
12. Kalaivani, R.M., Andrews Scoot, D., Latha, S.: The role of value added services between customers and service providers in tourism industry. International Journal for Multidisciplinary Research. 5, 1–5 (2023).
13. Blyznyuk, T., Naumov, O., Shepeleva, O.: The influence of the effectiveness of intercultural communication on the development of the tourism industry. (2024).
14. Shalaik, B., Jacob, R., Mooney, P., Winstanley, A.C.: Using haptics as an alternative to visual map interfaces for public transport information systems. Ubiquitous Computing and Communication Journal. 1280–1292 (2012).
15. Wu, H., Tan, J.-A., Ng, W.S., Xue, M., Chen, W.: FTT: A system for finding and tracking tourists in public transport services. In: Proceedings of the 2015 ACM SIGMOD international conference on management of data. pp. 1093–1098 (2015).
16. Knott, D., Martinelli, D.: Communication strategies for state transportation research programs. Transp. Res. Rec. 1924, 52–58 (2005).

17. García, C.R., Pérez, R., Alayón, F., Quesada-Arencibia, A., Padrón, G.: Provision of ubiquitous tourist information in public transport networks. Sensors. 12, 11451–11476 (2012).
18. Ramnani, A.: The role of language in shaping the international cultural tourism experience of student-travelers. San Jose State University (2012).
19. Kim, E.E.K., Mattila, A.S.: The Impact of language barrier & cultural differences on restaurant experiences: A grounded theory approach. (2011).
20. Gao, J., Wu, C., Yang, Y., Nootchanarta, C.: Does culture matter? Thai perception of international tourist misbehaviors and its consequence. Asia Pacific Journal of Tourism Research. 30, 147–160 (2025).
21. Seongseop Kim, S., McKercher, B.: The collective effect of national culture and tourist culture on tourist behavior. Journal of Travel & Tourism Marketing. 28, 145–164 (2011).
22. Croucher, S.M., Kelly, S.: Measurement in intercultural and cross-cultural communication. In: Communication research measures III. pp. 141–159. Routledge (2019).
23. Arasaratnam, L.A.: The development of a new instrument of intercultural communication competence. Journal of intercultural communication. 9, 1–8 (2009).
24. Klein, G.D.: Development of a cross-cultural instrument to measure the attitudes of consumers and business people toward consumerism. Journal of Marketing & Public Policy. 1, 123–137 (1982).
25. Reardon, J., Miller, C.: The effect of response scale type on cross-cultural construct measures: An empirical example using Hall's concept of context. International Marketing Review. 29, 24–53 (2012).
26. Gudykunst, W.B., Kim, Y.Y.: Communicating with strangers: An approach to intercultural communication. McGraw-Hill New York (1992).
27. Sahoo, M.: Structural equation modeling: Threshold criteria for assessing model fit. (2019).
28. Tavakol, M., Dennick, R.: Making sense of Cronbach's alpha. Int. J. Med. Educ. 2, 53 (2011).
29. DeVellis, R.F., Thorpe, C.T.: Scale development: Theory and applications. Sage publications (2021).
30. Field, A.: Discovering statistics using IBM SPSS statistics. Sage publications limited (2024).
31. Sijtsma, K.: On the use, the misuse, and the very limited usefulness of Cronbach's alpha. Psychometrika. 74, 107–120 (2009).
32. Kline, P.: Handbook of psychological testing. Routledge (2013).
33. Podsakoff, P.M., MacKenzie, S.B., Podsakoff, N.P.: Sources of method bias in social science research and recommendations on how to control it. Annu. Rev. Psychol. 63, 539–569 (2012).
34. Schmitt, N.: Uses and abuses of coefficient alpha. Psychol. Assess. 8, 350 (1996).
35. Carpenter, S.: Ten steps in scale development and reporting: A guide for researchers. Commun. Methods Meas. 12, 25–44 (2018).
36. Tabachnick, B.G., Fidell, L.S.: Using multivariate statistics (7th Ed.). Published online. (2019).
37. Hambleton, R.K., Swaminathan, H.: Item response theory: Principles and applications. Springer Science & Business Media (2013).
38. Allen, M.J., Yen, W.M.: Introduction to measurement theory. Waveland Press (2001).

39. Ebel, R.L., Frisbie, D.A.: Essentials of educational measurement. (1972).
40. Nunnally, J., Bernstein, I.: Psychometric Theory 3rd edition (MacGraw-Hill, New York), (1994).
41. Ward, C.: The psychology of culture shock, (2001).
42. Reisinger, Y., Turner, L.: Cross-cultural behaviour in tourism. Routledge (2012).
43. Chang, N., Chen, L.: Evaluating Leraning Effectiveness of an Online Information Literacy Class Based on the Kirkpatrick Franework. De Gruyter Libri. (2014).
44. Schwarz, N.: Self-reports: How the questions shape the answers. American psychologist. 54, 93 (1999).
45. Tourangeau, R., Rips, L.J., Rasinski, K.: The psychology of survey response. (2000).
46. Harkness, J.A., Van de Vijver, F.J.R., Mohler, P.P.: Cross-cultural survey methods. Wiley (2003).
47. Krosnick, J.A.: Response strategies for coping with the cognitive demands of attitude measures in surveys. Appl. Cogn. Psychol. 5, 213–236 (1991).
48. Harzing, A.-W.: Response styles in cross-national survey research: A 26-country study. International journal of cross cultural management. 6, 243–266 (2006).
49. Willis, G.B.: Cognitive interviewing: A tool for improving questionnaire design. sage publications (2004).

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